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PROBLEMS OF SCOTTISH CLIMATOLOGY

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[Informal Address to the Royal Meteorological Society, in the University of Edinburgh, May 28, 1945]

Owing to the operations of external agencies not hitherto under our control, there has been no meeting of the Royal Meteorological Society in Edinburgh since 1936. It is not to be forgotten that the Scottish Meteorological Society amalgamated with this Society in 1921, and that Scotland has a long-standing interest in meteorology which must certainly not be allowed to flag. In this informal talk I address myself primarily to the younger University men and women who should carry on that tradition.

British science probably owes more to the "amateur" than that of any other country. Indeed it has at times been said that we are incorrigibly a race of "amateurs"; better described, perhaps, as "volunteer enquirers." There is, for instance, the truly magnificent record of the Royal Society, whose volumes of *Philosophical Transactions* run straight through from 1665. Literature, painting, and architecture we have; but is not also that row of volumes one of the finest flowers of this diverse island? Come nearer home; here in the National Gallery of Scotland are the Raeburns; but let us not forget that Napier's logarithms were also a flower of eastern Scotland—that Napier who not only attended the General Assembly, but was doubtless equally conscious of Edinburgh's east wind.

The tradition of free enquiry can be followed from the great days of discovery and the encouragement of the precise recording of observations—first of the world itself, in the maps of which Timothy Pont is the Scottish exemplar; then of the phenomena of the world. In meteorology the seventeenth-century evolution of measuring instruments led gradually to a rational climatology on the one hand, slowly evolving in the era of accurate classification (or portraiture); and then the more developed analysis of the physical processes underlying the daily changes marched hand in hand with the other physical sciences. Edinburgh gave us Hutton's theory of rain in 1784, as well as the wet-and-dry-bulb thermometer.

Scotland has a long history in this respect; we can esteem the passion for accurate measurement in the unknown Edinburgh physician who kept those first records from 1731-36 which Mossman reduced to form part of the longest continuous British series. In the same mid-eighteenth century, Roy, the more accurate surveyor, finds his parallel in men such as James Hoy of Hawkhill,

and so we go on to Miller of Glasgow noticing the effects of a deep snow cover and recording, hour by hour, the temperature on the bitterly cold nights of January, 1780. Hutton and Playfair were followed by such pioneers as Lord Minto, with his early balloon observations, and Brewster's encouragement of hourly records at Leith in 1824-25, when diurnal range became a subject of interest. Then the brilliant young Forbes, later Principal of Edinburgh University, gave his lively report to the British Association in 1832. He was then 23 ; and his report is still worth reading. " Much time and labour have been spent in making observations utterly useless for any scientific purpose. . . . Had the meteorologist taken advantage of lofty and mountainous situations to study the formation and dissolution of clouds and the influences of humidity and temperature in their phases, or of a low flat country for determining the amount of solar and terrestrial radiation in sheltered spots and under different aspects of the heavens . . . he would have conferred a greater boon than by mere daily accumulation of instrumental observations."

If that could be said 113 years ago, where are we now? Of course the instrumental technique was then so imperfect that many observations were useless ; and I have no need to do more than remind you of the subsequent improvement, for example, in regard to that recording of air temperature, associated with Thomas Stevenson. But there is also another Scottish tradition to follow. In the same era there arose one of the greatest of those most useful men who have analysed and brought order into the vast accumulation of observations : Dr. Alexander Buchan. Anyone who ever looks at climatological maps cannot fail to reflect on who first began to reduce the data ; and here in Edinburgh Bartholomew's maps remain as a testimony. Of that generation Dr. Hugh Robert Mill, born in Thurso and bred in the Buchan tradition, is still with us to represent the " great Victorians."

The data still accumulate ; Forbes' challenge still stands ; and there is still a big field open to the younger generation as we shall see, not only in physical investigation, but also in the reduction of observations to assimilable form and in subsequent discussion.

Scots of every class and in every walk of life, from the manse and surgery, castle and cottage, farm, lighthouse and laboratory, have lived in the same air and have manifested this interest in the weather ; that is what I mean when I say that meteorology has flowered here. An Englishman may acknowledge that it has at times been pursued with a more intense and penetrating vision, not unrelated to the perennial need in Scotland for looking further ahead. But there are other cool rainy lands where marginal agriculture prevails which have also produced men of vision : think of Norway, or for that matter Wales and Cumberland. In Scotland the vicissitudes of the weather are, however, of stern significance ; the contrasts are sharper than further south. The beauty and brilliance of a Scottish June is the more intensely felt by virtue of its contrast with the grim possibilities of April in Aberdeenshire ; the long days of Edinburgh haar ; the September wind beating down the oats in Lanark, or the overwhelming wind and rain of December in the Isles ; the cold brilliance of a white January on Speyside, or the ferocious penetrating cold of a Glasgow inversion fog.

The possibilities of the Scottish climate, in relation to the normal, are in many places more extreme than in England. Consider, for instance, the remarkable drought of 1937 in Wester Ross, or the phenomenal warmth of March 1938 on Deeside. There is also a wider *local* range of climate, well illustrated by the Arctic summit of Ben Nevis : exposure to wind or shelter is more significant. It remains to be seen how far the challenge of the Scottish climate can be met by men. Can the peat be cut away permanently from the northern half of Lewis? Can shelter be given by afforestation : and can afforestation take place along the windswept western lochs? Will drainage and cultivation so improve the grasses that the minimum temperatures at night are less extreme? All this reflects the need for better and closer assessment of climatic possibilities ;

the discussion, analysis and comparison of observations is needed equally with the mere collection. So much of Scotland is marginal or debatable land, and no doubt I need not remind you of Professor Ogilvie's papers; I would, however, remind you that observations have long been kept on that type of upland country and the data from such stations as Dungavel, maintained by Group Captain the Duke of Hamilton, can give us plenty of useful information when properly analysed. Forbes and Buchan have indicated two paths: physical investigation on the one hand, and analysis, discussion and comparison are needed as well as mere compilation of observations.

Scotland then must produce meteorologists by its very nature: what are they to do? Nowadays some are professionals by choice: looking through the *Journal* of the Royal Meteorological Society of late years Scottish names, and especially those of Edinburgh graduates, are conspicuous. Some have lately had the profession thrust upon them in the R.N. or R.A.F. Many, however, remain likely to revert to amateur status after the war. Many others, graduates or graduates-to-be, are to be found who are interested in weather, but whose duties lie elsewhere. Here in this university are the geographers: "licensed enquirers" into any surface phenomena on the earth. Are their enquiries to stop when they leave the university? Here, too, are the physicists: licensed enquirers into the behaviour of matter. There *may* be a fashion for the electron, but there is also the large-scale complexity of the atmosphere. Do you all really know why raindrops aggregate?

Now it is not given to us all to be physicists. Apart from desire, many of us have neither laboratory nor technical equipment. The quality of Highland sunshine; the varying rate of modification of Arctic-maritime air throughout the centuries, can only be discussed with the aid of a full programme of upper-air observations. But in a mountainous country direct observation is always remunerative; the flow of the air among the mountains is an object of immediate study of the utmost importance to airmen. Further, the rate of change of the climatic elements in time and space is so rapid as to afford endless problems at one's very door. How far is Scotland an atmospheric breakwater? How far are fronts held up in winter along the north-west coast, so that a zone of heavier rainfall may occur out to sea rather than on the coast itself? Is this related to the extraordinary violence of the south-easter reported by Dr. Fraser Darling from Rona? This sort of enquiry, meteorological at first sight, affects climate, especially the possible secular variations in the far North-West of which we know little save that they may go in an opposed rhythm to those of South-East England. We know too little about historic fluctuations; there is room for a dendrochronology in the North-West Highlands just as much as in the Tennessee valley. Was the eighteenth-century Scottish climate favourably affected, or otherwise, at the time of the great advance of the Scandinavian glaciers?

All these problems involve the analysis and application of existing data; and such efforts may be of very practical importance. For example, the Scottish Secretary of the Royal Meteorological Society, Mr. Dunbar, has recently examined forty years of temperature records in western Scotland to see whether any tendency for exceptional extremes to occur at particular times of year was evident and, if so, whether they were contemporaneous with those at London. Such work clears the ground for others, just as the water engineers of southern Scotland have analysed data which may later be of assistance in discussion of Highland power resources.

The interpretation of rainfall is still not always easy; for example, the driest part of Arran does not appear to be where one might at first expect, a fact probably related to the lines of flow of the air currents up the Firth of Clyde.

I shall not say anything about snow beyond the admission that it struck me some years ago that a vast amount of observational material had been collected and not hitherto reduced to order, or to a map of frequency. Many other climatic observations taken here and there need treatment, and so much of this

work cannot be done by the already overworked "professionals." Neither ought I to comment again on Scotland's "natural thermometer"—the semi-permanent snow-beds of Ben Nevis and the Cairn Gorms. To note the extent of such beds from time to time, especially in September, should be a splendid job for students. Ahlmann, the great Swedish geographer and glaciologist, has recognised their significance. Cannot more be done in Scotland?

The "amateur," especially with some training, can rove more freely: like Livingstone, we can go beyond the areas already mapped. There is still the wide field of local climatology in relation to agriculture, fruit, and forestry, and again Scotland offers such rapid contrasts as to be well within the powers of individual investigators. Compare the very rapid rise in the frequency of snow-cover from Edinburgh to West Linton and the varied local incidence of frost—not solely a matter of relief and soil but also, as recently shown, a function of the character of the grassy vegetation. All these may well be of great significance not only in national planning, but also in judging the worth of land improvement.

Straightforward observation of miscellaneous phenomena is exemplified in a very attractive short paper by Lamb in our *Quarterly Journal* in 1938, concerning industrial smoke drift and the extent to which the Glasgow smoke became canalised by the Ochils, a matter of obvious importance in forecasting visibility. Would it be possible, again, to collect observations by autographic means from Ben Nevis? The Americans have used their station on Mount Washington for work on the rate of icing of aircraft; would work on Scottish summits be worth reviving? Scotland still holds a British record for low temperature (−23° in a Berwickshire frost-hollow in 1879), but the great upland valleys of the Cairn Gorms should do better. The stability of inversions in Greenland fjords is important; but the stability of inversions and the effect of the freezing-over of lakes could well be studied much more conveniently in similar-shaped valleys in Scotland, such as Glen Einich, and record-breakers might obtain some additional satisfaction.

You will see from all this what abundant opportunities there are for work in the field, or in tidying up the mass of unco-ordinated material for others, or in applications, for example, to agriculture. Must so much of Scotland necessarily lie down under its climate, or can it be mitigated?

But Forbes' vehement criticism about the random collection of observations should not be forgotten. Decide what you want to do; planned enquiry is of far more value. Planned enquiry means that the individual is, so to speak, growing his flower (namely, meteorological research) with care in a garden, rather than scattering it to the winds; and Scots have always known the value of gardening. Planned enquiry on the part of the nation means that bigger gardens, or even greenhouses, should be provided—by which I mean that meteorological research should be fostered to a greater extent in the universities.

Scotland is fortunate in its scholarships; but whether one can yet envisage the further recognition by any of our universities of meteorology as a subject of study remains to be seen. Scotland and England can both regard it as very remarkable, in view of our record, that there is still only one chair of meteorology in the British Empire. While that is the case, we have the duty of developing the work of those forefathers from whose past accomplishments and early scientific papers we can derive inspiration; for they lived in the same weather. But with Forbes, let us try to get to the meaning behind the observations; or with Buchan, let us try to epitomise and reduce to rational order the otherwise bewildering aggregation of data, so that others may come with less clouded vision to this fascinating business of explaining the weather.

LAND RECLAMATION IN SCOTLAND

By Professor A. G. Ogilvie, O.B.E., F.R.S.E.

It is possible that in the future, and perhaps in the next decade, reclamation of land from the sea will become a matter of greater practical importance than has been the case during the last century. This would seem to depend upon conditions which cannot be foreseen but may very well arise. It may be necessary to produce still more food at home; there may be need to find employment for unskilled labour; and finally, there is more than a tendency to regard projects of this kind as of interest not merely to the private owners of land, but to the nation.

In taking stock of potential national resources the possibility of extending the land area is often forgotten. This seems to be particularly true of Scotland despite the fact that most of the land formerly reclaimed is of a very productive type. The subject was systematically examined by the Royal Commission on Coast Erosion, the Reclamation of Tidal Lands and Afforestation in the United Kingdom (Final Report, 1911); but in regard to Scotland the voluminous evidence was on the whole much more concerned with erosion than reclamation. However, a report received by the Commission from the Director-General of the Ordnance Survey disclosed that in a period between revisions of the maps, generally about forty years, the net gain of land amounted to about 4000 acres. This omitted the most of the Atlantic seaboard, where the changes were not measured. The Director-General was unable to state how much of the area gained was due to natural accretion, and how much to reclamation. There are no easy means of ascertaining how much land has been reclaimed in the past by the initiative of private proprietors; but in the aggregate this must be considerable. The usual purpose was to gain agricultural land and, admittedly, the work was done when the cost of labour was very low. Moreover, it is safe to assume that the material needed was found near the sites.

It will be useful, therefore, to review the possibilities of adding to the extent of Scotland by reclaiming the foreshore. The following examination is not intended to be exhaustive or very detailed; the purpose is simply to draw attention to the chief localities where reclamation seems to be physically possible by employment of the usual methods, and to give an estimate of the area to be gained and of the lengths of the enclosing embankments. Few of the sites are known to have been examined by experts; but a useful purpose may be served if this paper evokes records of serious discussion relating to projects that never reached Parliament or publication. It must be emphasised that this review refers to physical possibilities only. No attempt is made to discuss the economics of the reclamations suggested. At most of the sites the object of enclosure must presumably be to increase the area of good agricultural land. But it is scarcely necessary to add that where a foreshore is required for industrial purposes, the work is more likely to be undertaken, since capital is more readily available.

The usual and simple method of adding to the dry land is to encourage the sea to deposit its load of silt a little higher than it does under natural conditions, generally to about the level of high water, at least during neap tides; and thereafter to exclude the sea for ever. The localities which favour this procedure are broad foreshores where the seaward slope is very gentle and on which marine deposit is an active process. These areas are not numerous in Scotland, and they are widely spaced around the coast. An embankment or training wall is built to enclose the area to be reclaimed high enough to admit the sea at high tide. In the sheltered water behind this, silt is progressively deposited and, when the required level is reached, the sea-wall is raised, and where necessary faced, to withstand waves. The initial cost, then, depends mainly on the length of embankment and the conditions of procuring and bringing materials for it. It follows that an important factor is the ratio between the length of wall and the area enclosed. Moreover, rivers which naturally flow on to the foreshore

selected must either be diverted or furnished with high protective banks, and this of course adds to the cost.

In cases where local physical conditions favour reclamation there are still two considerations to be taken into account, apart from the economics of the projects, although they do bear on this subject. The first is physical in character and the second, legal. By enclosing any large area of foreshore the engineer makes a new shoreline to which waves and currents must adjust themselves. This may lead to the erosion of some neighbouring stretch of coast or, as is more usual, produce much deposition where previously there was little; and this in turn may hamper navigation at a seaport. Furthermore, if the reclamation be in the estuary of a navigable river, the artificial narrowing may reduce the amount of tidal scour in the channel, and so necessitate dredging. But in other cases it may increase the scour. While the law of the foreshore is complicated, it is obvious that any reclamation affects the rights of the Crown and those of the riparian landlords; and it is quite possible that other parties may have to be satisfied before the boundary of Scotland can be altered.

In the review which follows, the basis of measurement is in most cases the one-inch map of the Ordnance Survey. Any attempt at more detailed assessment than is indicated by this scale has been purposely avoided as inappropriate to a general discussion of the subject. It has been taken as a general assumption that the sea-dyke or wall would be built not along the low-tide line (at ordinary spring tides) but at about the half-tide line. This line is, of course, not surveyed, and it has been presumed to lie half-way between the two tide-marks shown. In view of the much greater cost of embanking in deep water it is safer to make the more conservative estimates of reclaimable foreshore that result from this course.

Where measurements are not explained by the text the number of acres is the area enclosed and the number within brackets the length of the embankment in yards, including artificial river-banks if these are called for.

The localities will now be described in general order northward from the Tweed, and then southward to the Solway.

The Eastern Coast

The Tyne Mouth. The mouth of the East Lothian Tyne is hemmed in by the spit of Sandyhirst and the promontory of West Barns Links. Two embankments (3250) would reclaim 295 acres in two parts, allowing space for the river channel between.

Aberlady Bay. This forms the estuary of an inconsiderable stream which would be diverted. A dyke from Aberlady Point to Gullane links (1550) would enclose 260 acres.

Almond Mouth. The river mouth at low tide lies close to Cramond Island. If two enclosures were made reaching out to the Island west (3900) and east (2100) of the channel, the gains would be respectively 410 and 250 acres.

The Upper Firth of Forth. Above Queensferry both shores of the Firth and estuary are flanked by large foreshores of which the western parts are chiefly of mud. On the reclamation of these "sloblands" the Royal Commission heard much evidence, including that of the late H. M. Cadell. Since he gave full accounts of the subject in *The Story of the Forth* (1913), and later in a paper published in this *Magazine* (1929, 45 (*1*): 7-22; (*2*): 81-100), on "Land Reclamation in the Forth Valley," it is unnecessary to refer at length to these tracts of the coast. Cadell records the reclamations made for agricultural purposes from 1770 onwards. On the south shore these extended the Carse of Stirling by a continuous strip about ten miles long and comprising 895 acres, from the lowest bend of the Forth opposite Alloa down to the bay beyond the River Avon. On the north shore three areas, together 686 acres, formed another strip beginning south of Alloa and extending, with breaks, some five miles to Longannet Point.

The Grangemouth Docks had also been built south of the River Carron and

INVERNESS FIRTH
AT PETTY

Photo by R. M. Adam.

LOCH FLEET,
SUTHERLAND

Photo by R. M. Adam.

pushed out to low-water mark. Three schemes have been advanced for enclosing almost all of the remaining mud-flats (*c.* 3600 acres) west and east of the Carron. These were due to T. L. Learmonth, T. Meik and H. M. Cadell respectively. None has been adopted, but the Forth Conservancy in 1926 began to enclose 310 acres of the most easterly inshore part by a dyke of 2370 yards. This adjoins the fields reclaimed in 1774 and the ground gained by Cadell to the east for industrial purposes.

Despite rejection of earlier schemes, the remaining reclaimable areas in the upper Forth may be given thus :—(*a*) 1650 acres between Grangemouth and Bo'ness, with a sea-dyke of 5420 yards and embankments along the Avon each of 1900 yards ; (*b*) 680 acres west of Grangemouth with a sea-dyke (2420) ; (*c*) 540 acres in Torry Bay on the Fife shore. This foreshore, now over one mile wide, contains Preston Island, one and a half miles west of Crombie Point and half a mile from the extending debris of the Valleyfield Colliery ; the sea-wall would join these three points, most of it probably along the half-tide line. The presence of such a structure would be likely to increase the natural accretion in the re-entrant towards Culross, and part of this might be reclaimed later.

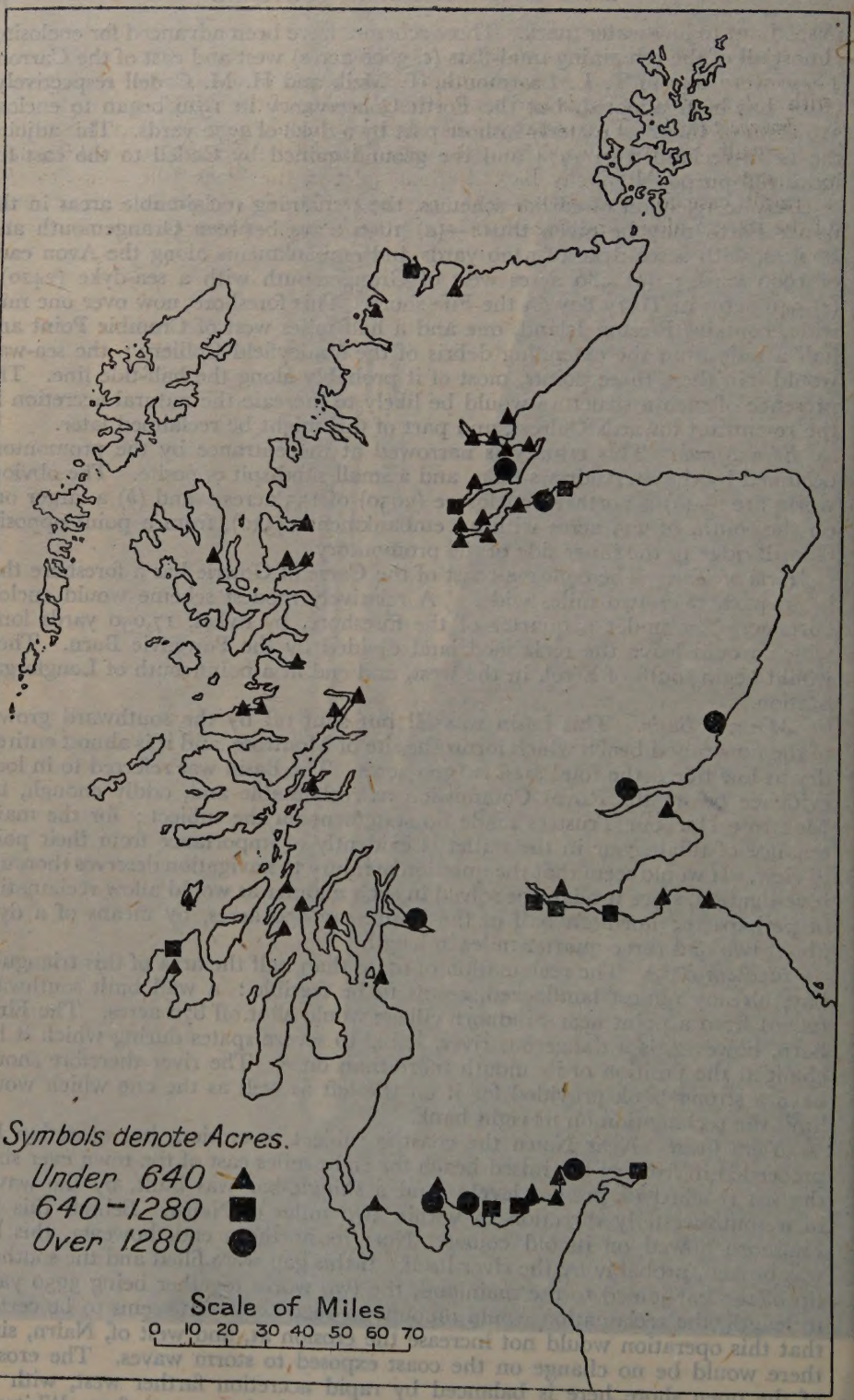
Eden Mouth. This estuary is narrowed at the entrance by the promontory occupied by the St. Andrews links, and a small sand-spit opposite. The obvious works are :—(*a*) a northern enclosure (3050) of 155 acres ; and (*b*) a larger one on the south, of 395 acres with an embankment (4520), from a point opposite Guardbridge to the inner side of the promontory.

Firth of Tay. The concave coast of the Carse of Gowrie has a foreshore that is, in part, over two miles wide. A relatively modest scheme would enclose 2610 acres, or under a quarter of the foreshore, by dykes, 17,050 yards long, which would leave the reclaimed land divided by the Powgavie Burn. These would begin south of Errol, in the west, and end at a point south of Longforgan Station.

Montrose Basin. This basin was all but shut off by the southward growth of the now raised beach which forms the site of Montrose, and it is almost entirely dry at low tide ; the total area is 1900 acres. The Basin was referred to in local evidence before the Royal Commission as reclaimable and, oddly enough, the Montrose Harbour Trustees made no statement on the subject ; for the maintenance of tidal scour in the outlet is evidently of importance from their point of view. It would seem that the question of injury to navigation deserves thorough investigation, since it might be solved in such manner as would allow reclamation of perhaps the northern half of the Basin, say 950 acres, by means of a dyke about two and three-quarter miles in length.

Findhorn Bay.[1] The reclamation of more than half the area of this triangular bay, already almost landlocked, seems to be feasible : a wall built southward (2600) from a point near Findhorn village would shut off 870 acres. The Findhorn, however, is a dangerous river, liable to severe spates during which it has changed the position of its mouth more than once. The river therefore should have a strong bank provided for it on the left as well as the one which would limit the reclamation on its right bank.

Nairn Coast. Near Nairn the coast is subject to erosion, but accretion has proceeded in front of the raised beach for eight miles east of the town ever since the sea reached its present level ; and a shingle-bar was built, by the waves, in a south-westerly direction to within two miles of Nairn. Behind this the Findhorn flowed on its old course. Near its northern end, however, this bar was broken, probably by the river itself. If this gap were filled and the southern tip of the bar joined to the mainland, the two works together being 3950 yards in length, the reclamation would amount to 1620 acres. It seems to be certain that this operation would not increase the erosion at, and west of, Nairn, since there would be no change on the coast exposed to storm waves. The erosion of the open shore here is balanced by rapid accretion farther west, with the extension of a spit which diverges from the original shore, to form Whiteness Head. Behind this is the triangular foreshore off the Carse of Ardersier. The



Scotland. Suggested reclamation of land from the sea.

KINLOCH,
KYLE OF TONGUE

Photo by R. M. Adam.

AIRDS BAY,
APPIN

Photo by R. M. Adam.

whole of this could be reclaimed to yield perhaps 550 acres ; but careful investigation should precede such a project in view of the delicate situation at the entrance to Inverness Firth.[2] A safe minimum reclamation would be that of 210 acres, with a dyke of 1050 yards and some strengthening of the shingle-spit.

Inverness Firth. Two reclamations might be effected here :—(*a*) at the southern end a wall (2800) eastward from the raised fan of the River Ness would reclaim 450 acres ; (*b*) Munlochy Bay, the long inlet in the Black Isle, seems to offer a simple case for a short sea-dyke, perhaps only of 1400 yards with diversion of the stream along one side of the enclosure (2700). The area reclaimed would be 470 acres.

Beauly Firth. Almost half of this Firth, at its western end, is uncovered at low tide, and the silt resembles that which underlies the valuable land round Beauly. Training walls north and south of the channel of the River Beauly (3800 and 3180) would give areas respectively of 400 and 470 acres. In view of the great depth at the entrance to the Firth, opposite Inverness, it is unlikely that the reduction in tidal scour here would be appreciable.

Cromarty Firth. Four localities seem to offer scope for reclamation, viz. :—

(*a*) The inner end : This resembles closely the corresponding part of Beauly Firth, and again outfall for a river, the Conon, must be ensured. An embankment (3510) east of Dingwall would enclose 440 acres ; and another (4200) on the Black Isle shore would yield 400 acres. In 1823 a plan was made to reclaim "from 500 to 800 acres" at an estimated cost of £5000.

(*b*) Alness Bay : By joining the raised fans of the Rivers Glass and Alness (2850), 580 acres would be enclosed.

(*c*) Udale Bay : A sea-dyke (2500) would enclose 420 acres.

(*d*) Nigg Bay : The fertility of the land north of this Bay—the lowest raised beach—gives assurance that the effort of reclamation would be repaid ; but it is possible that some pumping, perhaps by windmills, would be necessary for agricultural success. The character and extent of the works doubtless would depend partly upon the question of a future mercantile seaport for Cromarty Firth, since docks might be required. However, the enclosure for agriculture of the inner bay would seem to be justified—say 1700 acres—by a sea-dyke of 4300 yards from south of Nigg to Barbaraville.

Dornoch Firth. Beset as it is by soft glacial and other deposits, this Firth is well-nigh clogged by the litter of waves and currents. Consequently much of the foreshore exceeds half a mile in width ; but to reclaim any large areas like the Dornoch Sands or the still greater stretches east and west of Tain, very long walls would be needed in proportion to the areas. Again, while the raised flat of the Morrich is being naturally extended towards the open sea behind an incomplete sand-bar, this feature would have to be replaced by a very strong sea-wall facing the north-easterly storms. The total reclamation here of 1010 acres would involve works 3150 yards long ; while the more sheltered eastern part, of 470 acres, would need only 1270 yards of dyke.

An area of 410 acres sheltered by the great shingle-spit at Meikle Ferry could very easily be gained with 1400 yards of wall, and 105 acres of Loch Evelix, on the opposite shore, with only 320 yards. Near the head of the Firth enclosures at Kincardine (1850) and Ardgay (1230) would yield 130 and 75 acres respectively.

Loch Fleet. This bottle-necked basin resembles Montrose Basin in origin and character ; but at Little Ferry there is no seaport to consider. The Mound, built across the head of the loch to carry the Highland Railway, has probably affected the drainage of the Glen by impeding the flow of water ; but this bears little relation to reclamation of the loch itself. Nevertheless it is not clear how ambitious this should be ; a minimum suggested is one of 210 acres (1850) in two parts, east of the channel, and 110 acres (1650) to the west.

The Northern Coast

On the north coast of Sutherland two inlets call for attention. The Kyle

of Tongue and the Kyle of Durness, in contrast to the deep fiord of Loch Eriboll which lies between them, both are floored with detritus, most of which is bare at low tide. It is difficult without local study to assess the caution that would have to be observed in planning reclamations in these Kyles ; in particular, the rivers and their habits must be known intimately.

Kyle of Tongue. The inner half of this funnel-shaped inlet seems to offer scope for two enclosures :—(*a*) south of the spit leading to Tongue Ferry : 235 acres (2160); (*b*) farther south on the west side of the Kyle: 270 acres (3020).

Kyle of Durness. The double bend in the Kyle gives it protection from storm-waves in most of its extent. Moreover, since the only road to Cape Wrath is connected with the main road of the North-West by ferry alone, it is reasonable to suggest a sea-dyke, near the present ferry and 700 yards long, which would later be raised to carry a road. This would enclose 860 acres ; but within this it would be necessary to provide embanked cuts for the rivers and burns over an aggregate length of at least 7000 yards. A still bolder project would place the sea-dyke, and ultimately the road, over a mile nearer the entrance where the Kyle is only 460 yards wide. This would gain an additional area of 300 acres (making 1160 in all), but about half of this is still covered at low tide.

The Western Coast

Owing to the steeper character of the west coast, foreshores in general are narrow. There are, however, a few places where small reclamations might have special importance in view of the scarcity of flat land. Islay alone offers larger scope. In addition to the length of sea-walls mentioned, works for diversion of rivers would be required.

The following is a selection of suggested smaller reclamations :—

Laxford Bay	105 acres	(50 yards)
Loch Torridon	110 „	(900 „)
Loch Kishorn	167 „	(700 „)
Portree Bay	165 „	(800 „)
Loch Carron	345 „	(1720 „)
Loch Nevis	160 „	(800 „)
Loch Moidart	320 „	(600 „)
Kentra Bay (Ardnamurchan)	520 „	(1950 „)
Loch Linnhe (head)	95 „	(1400 „)
Loch Linnhe (Inverscaddle)	150 „	(660 „)
Loch Linnhe (Ardmucknish)	60 „	(240 „)
Loch Gilp	180 „	(1000 „)
Loch Riddon	290 „	(750 „)
Loch Crinan	200 „	(2150 „)
Loch Caolisport	160 „	(1060 „)
Oronsay Strait	400 „	(650 „)

The central plain of Islay is flanked by broad foreshores, south and north. Part of the former, 390 acres of Loch Indail, would be reclaimed by a dyke of 2800 yards ; but Loch Gruinart in the north presents a more intricate problem. The inner part of this might easily be shut off by a barrier 1400 yards in length, enclosing 950 acres. But the plain to the south is nearly flat and very low. Consequently, in addition to the usual embanking of rivers on the reclamation (at least 5000 yards), it might be necessary to instal pumps.

Firth of Clyde. Sedimentation appears to be sufficiently active on the Dumbartonshire side to justify reclamation ; but the Royal Commission reported that the Clyde Navigation Trust were opposed to further operations here, and probably with good reason. Yet the probable need for additional flat ground for factories here suggests that further investigation is desirable. On the coast of the outer Firth the Hunterston Sands, south of Fairlie, might be reclaimed to the extent of 530 acres by a training wall of 3500 yards.

LOCH TORRIDON,
NEAR ANNAT

Photo by R. M. Adam.

DUNTROON,
CRINAN BAY

Photo by R. M. Adam.

Irish Sea Coast

The counties of Dumfries, Kirkcudbright and Wigtown contained more than half the land gained from the sea in Scotland during forty years prior to 1906, as reported by the Ordnance Survey. In Dumfriesshire alone the net gain of land was 1669 acres and that of foreshore was 3490 acres. The Solway Firth, in fact, is one of the areas of British sea that is moving rapidly to extinction. The smaller inlets of Galloway likewise display large accretions, some of which have been partly enclosed in the past: especially those of Luce, Wigtown, Fleet, Kirkcudbright, Auchencairn and Urr. Reclamation in these bays would generally seem to require unusually high embankments. The tidal range is considerable, and at some places storm waves would have to be repelled. Moreover, the Rivers Luce, Cree, Fleet, Dee and Urr have their basins in the hills and are naturally liable to severe spates. The waters, however, of the largest of these systems—the Ken-Dee—is now under control by the hydro-electric works. But with due precautions it would appear that the valuable grazing and crop lands of Dumfries and Galloway may be notably extended.

Luce Bay. At the northern extremity the estuary of Piltanton Burn would be reclaimed by a dyke of 2100 yards and stream diversion of 2300, the area being 260 acres. The sand-dunes west of the estuary would have to be studied, since any extension would probably ruin the reclamation.

Wigtown Bay. Three areas invite attention:—(*a*) 230 acres at the mouth of the Cree and east of the channel, enclosed by a wall of 2400 yards and stream bank of 750 yards; (*b*) Wigtown Sands, west of the channel: 1410 acres (5500); (*c*) Baldoon Sands, south of the latter: 1790 acres (6600).

Fleet Bay. The almost complete elimination of this bay should be possible. A strong sea-wall would run from Garvellein Rocks east and south-east, 2850 yards, to Carrick Point, and this might later carry a useful road with a bridge at the new mouth of the River Fleet. The new embanked river course would prolong the existing cut by 4800 yards, and be joined by a similar course for the tributary Skyre Burn, of 1050 yards. The reclaimed area would be 1440 acres.

Kirkcudbright Bay. Enclosure of the eastern arm, called Manxman's Lake, would be effected by a dyke of 1500 yards with diversion of a burn (1800 yards) and yield 560 acres. A further reclamation of 350 acres (3980) west of the main channel might also be practicable.

Auchencairn Bay. The inner part of this double inlet might be shut off by a straight sea-wall, 2120 yards in length, thus reclaiming 1000 acres; there also would be some 6600 yards of river banks to build.

Estuary of the Urr. Two reclamations appear possible: (*a*) a small enclosure of 75 acres (710) opposite Kippford, and a larger one of 230 acres (2370) behind Rough Island; the latter would, however, suppress the sea-side attraction of Rockcliffe.

Solway Firth. Southernness, the promontory of coastal plain south of Criffell, is undergoing constant erosion, which is balanced by accretion of foreshore and land to the west. Only a small tract of this, however, seems to invite reclamation, and protection against storm-waves would be needed. The western spit of Mersehead Sands would be extended by a training wall of 5470 yards, enclosing 580 acres.

East of Southernness, projects would demand great care if the Nith is to continue to be navigable to Dumfries. Moreover, recovery of any great proportion of Solway Sands would involve the building of very long sea-walls nearly parallel to the shore and open to attack by waves with considerable fetch from the south. As a minimum, two small reclamations are suggested: (*a*) the enclosure of 500 acres on the western shore (4500), requiring diversion of a stream (1200); (*b*) that of the estuary of the Lochar Water to yield 960 acres (1950); the river would have to be diverted for over two miles.

But the Solway Sands might well call for a much bolder plan which would add to the land a large part of Blackshaw Bank and Priestside Bank and including the area (*b*) above. The enclosing dyke would measure nearly six miles (9800)

and a new outlet for Lochar Water would be about two and three-quarter miles long; but the area gained would amount to 7330 acres.

Finally, the estuarine channels of the Rivers Esk, Sark, and Eden remain to be harnessed; if this were carried out, above the railway viaduct south of Annan large tracts might be reclaimed in Dumfriesshire, and more in Cumberland. As a beginning, and perhaps without regulation of rivers, 1090 acres, below Gretna, might be added to the former: this with an outer bank of 5750 yards and stream diversion of 2750 yards.

The acreage of reclaimable areas may be summarised thus :—

East Coast	18,585
North „	1,365
West „	5,197
South „	15,355
Total	40,502, or 63·3 square miles,

which is larger than the smallest county, Clackmannan.

But let there be no misunderstanding of these figures. They are the result of some local knowledge and of measurement from maps—sufficiently careful for the present purpose. There is, however, no certainty that the sea-dykes would actually be built as they have been plotted on these maps. Nevertheless, an effort has been made to avoid placing them beyond the half-tide line, and it seems clear that the area which we or our successors could easily add to Scotland is of the order of sixty square miles.

Conclusion

The Royal Commission recommended that the body controlling reclamation in the United Kingdom should be the Board of Trade, and further, that they be charged with the duty of compiling detailed and scientific reports upon reclaimable land. It may be well to consider whether this latter provision should not be supplemented by another—the erection and maintenance of an official hydrological laboratory in this country. It is possible to mimic, on a small scale in a tank, most of the natural processes at work around our coasts. Civil engineers have often followed this practice in making preliminary studies of specialised type. But the apparatus has had to be specially constructed for separate projects, and by individual firms; and this expenditure is obviously justified only in relation to major schemes. A national laboratory, on the other hand, would be adaptable to experiments appropriate to large and small projects alike. Again, the National Surveys—Hydrographic or Geological—might be charged with the duty of ascertaining the thickness of sand or mud resting upon submerged rock, whenever this information is of value: e.g. in siting a dyke on Solway Sands.

A review of this kind, relating to possible changes to be wrought by the engineer, suggests some concluding reflection. In a land like ours that has been occupied so long, any effort to modify the natural course or sphere of the waters tends to arouse opposition, sometimes violent in character. This is prominent in relation to the harnessing of rivers for power. In that case the engineer is concerned with creating waterfalls or increasing such as exist. In doing so he is in effect fighting against Nature; for every river is engaged naturally in obliterating its waterfalls. When confronted with the action of the sea, the engineer again puts himself in opposition when he builds defences against erosion. But he also works with Nature, since in reclaiming foreshore he accelerates a natural process. In most areas referred to in this review, natural accretion of foreshore and of land induces changes that are visible within a generation. Hence, among those who have opposed reclamation in the past, the majority were probably aware that their descendants would lose the battle in any case, to Nature.

[1] On the localities mentioned, between the Findhorn and Loch Fleet, cf. Ogilvie, A. G., "The Physiography of the Moray Firth Coast." *Trans. Roy. Soc. Edin.*, 1923, Vol. 53, Pt. II, No. 19.

[2] Ogilvie, A. G. "The Physical Geography of the Entrance to Inverness Firth." *S.G.M.*, 1914, 30 (*1*) : 21-35.

MONTPELLIER: GIVER OF NAMES

By Swanzie Agnew

Several towns in Great Britain have streets named Montpellier or Montpelier ; Edinburgh alone counts three streets of this name. Montpelier occurs as a place-name in the vicinity of Derby, Bristol and Plymouth, and as the name of a village on the Shannon. In the United States the name graces not only streets but at least eight communities (including the capital of Vermont) widely separate from each other and each made individual by a distinct personality. But how many of those resident in streets and towns of that name are aware of its origin, or of the associations connected with it? The name Montpellier (Montpelier, Montpélier, 17th century) in the seventeenth and eighteenth centuries conjured in the mind a romance of elegance, of leisure, and of bright sunshine made sweeter by the perfume of rosemary and thyme. For, to some, these were the ideas associated with the town of Montpellier, near the Mediterranean shores of France, which was the " Nice " and its neighbourhood the " Riviera " to the wealthy of those days. To others, Montpellier was the Mecca of the cultivated mind, where men of science and medicine, amongst the foremost in learning, upheld the tradition of the second oldest university in Europe. What better, then, than give a newly founded town the name of Montpellier in the hopes that it might emulate its namesake ; or why not make a new building estate sound the more attractive by giving it so illustrious a name ?

But these memories of Montpellier have been forgotten. The Revolution brought the " glory " to an end, and other universities share the laurels of original research. In recent times Sir Patrick Geddes, by his building of the Scots College on the outskirts of Montpellier, did much to reawaken old memories and associations ; and those who have since enjoyed the hospitality of the Scots College (now owned by the French government), and the town of Montpellier, have many new ones added to their private storehouse.

Montpellier is one of a series of hillfoot towns and villages which skirt the edge of the scrub-covered limestone plateaux, known locally as " Les Garrigues." In front of them the Bas Languedoc plain inclines gently seaward until, within a few miles, it merges into the maze of lagoons and salt marshes that fringes the coast. The coastal swamps are malarious and there are few good anchorages ; for that reason all towns of any importance, save the artificially created port of Sète (Cette), are located inland on the great east to west highway first made prominent by the Romans. Each one of these towns has a history to be proud of. Arles, Nîmes and Narbonne show pride in their fine Roman monuments ; Montpellier boasts the second oldest university in Europe; Béziers, by her cathedral and old churches, remembers her ecclesiastical past ; while Pezénas and Beaucaire, now centres of little importance, live on the glory of their great medieval fairs.

Bas Languedoc is, indeed, a region packed with history. This part of Gaul was the springboard from whence the Roman culture of organised urban life and administration passed, by way of the Rhône-Saône corridor, to bring civilisation to the barbaric north. When one remembers the early beginnings of these towns it is the more surprising to find that the urban history of Montpellier dates only from the tenth century. While all other towns, save Nîmes which grew up by the side of an abundant fountain, can call forth the function of a port or bridgepoint as their *raison d'être*, Montpellier had neither of these stimuli to urban growth.

The original site of Montpellier was two hills (the highest barely 55 metres in height), standing like two islands offshore from the grey-green garrigue of which they were part. These two hills bore twin hamlets under separate feudal lords, that on the higher hill known as Montpellier and the other as Mont-

pellieret. No major road served them though close at hand, to the north skirting the garrigue proper, the old Roman road remained the chief highway, as the name in langue d'oc " Lou cami de la mouneda " signifies. To the south another road following the edge of the lagoons passed westward without touching the twin settlements. For reasons that cannot be wholly elucidated, these settlements grew in importance and were soon served by a third road which eventually ousted the two others in importance. This road " Lou cami roumieu " was essentially a pilgrim road for the devout travelling west on holy pilgrimage to St. Jacques de Compostelles and those " Les Roumieus " moving east to pay their devotions in Rome. They came to Montpellier for shelter at one stage of their journey, for there had been erected for sanctuary and prayer the church of Nôtre Dame. To the name of this church was soon added a qualifying phrase, and it became known as Nôtre Dame des Tables. The " tables " were those of the merchants and money-lenders who under the shadow of the church did business with the pilgrims and travellers. Later the market and social life became centred at this same spot, until the church was finally destroyed in the religious wars.

Growth of the settlements was so rapid that by common consent the two, in 1196, were fused together and enclosed in a wall known as " le mur de commun clôture " ; and the township so formed took the name of the settlement on the higher hill and henceforth was known as Montpellier. The building of the wall and its defence depended on the burghers, for the feudal rights had been forfeited and a republic instituted, governed by representatives of the different guilds of which the bankers and financiers were the most influential. The guilds, anxious to further their commercial contacts, canalised the river Lez which flowed east of the town and built a port just without the city gates. Montpellier, now an important centre on the east-west highway from Italy to Spain and with access to the sea, could tap the currents of trade and commerce in the Mediterranean world and the Levant beyond.

The Rabbi Benjamin of Tudela, writing in the twelfth century, gives this picture of Montpellier : " C'est un lieu très favourable au commerce, où viennent trafiquer en foule chrétiens et sarrazins ; où affluent des Arabes du Garb [North Africa], des marchands de la Lombardie, du Royaume de la Grande Russie, de toutes parties de l'Egypte, de la Terre d'Israël, de la Grèce, de la Gaul, de l'Espagne, de l'Angleterre, de Gênes, de Pise, et qui y parlent toutes les langues." Among these travellers and tradesmen were men of learning, Jewish doctors, Arab scientists, Italian jurists, and these settling in Montpellier gathered students round them and formed the nucleus of the medical and law schools. Soon the humanities were added, and a century later these separate schools were by Papal Bull (1289) granted the status of university in the modern sense of the word.

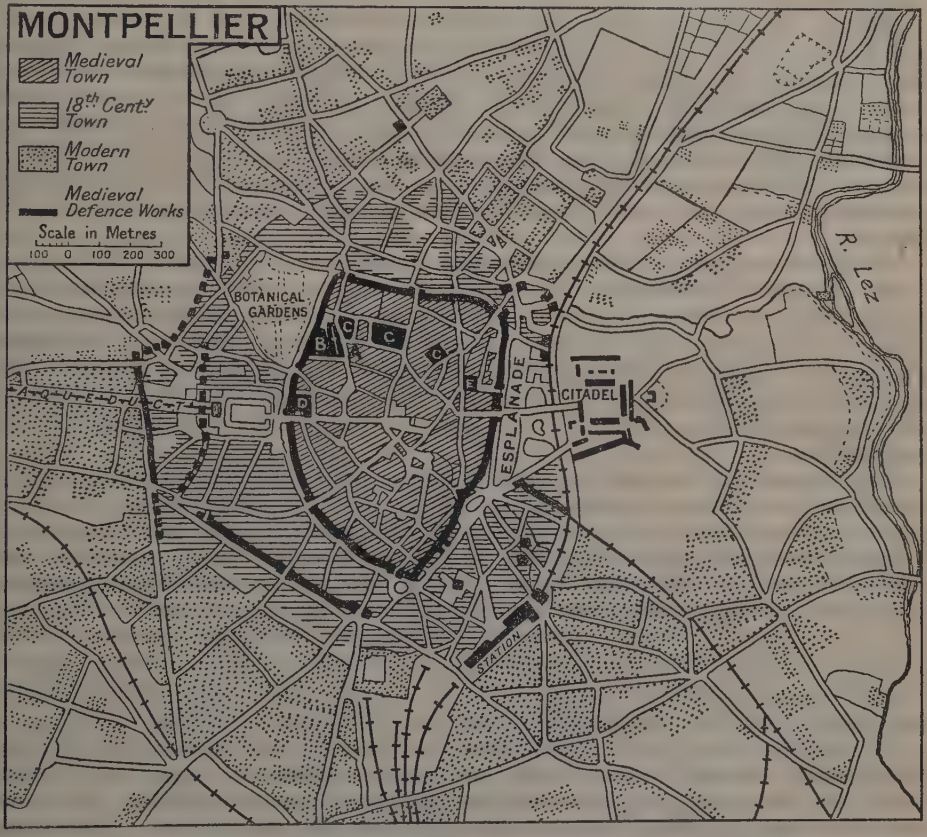
If the commercial and cultural side of the city was flourishing, the industrial side was no less prosperous. Raw materials were abundant. Flocks pastured on the garrigue gave wool and skins as basis to the textile and leather-dressing industries. Dyed in scarlet and bright blue from the vegetable dyes at hand the cloths and leather goods had ready sale in the Levant. From the garrigue, too, aromatic herbs and plant parts were gathered for the distilling of essences and the making of medicines and perfumes. Already in medieval times wine was an important commodity and the sale of choice vintages, besides the making of the blue-green paint known as vert-de-gris (action of wine on copper), brought wealth to another section of the community.

By 1364 the town had expanded beyond the wall of the " commun clôture " and the industrial suburbs established outside its protection clamoured for some sort of defence. To comply, the town constructed further fortifications, but these never constituted a continuous rampart but consisted of palisades and ditches and towers commanding the principal routes converging on the city.

But nothing is left of the " Grand Medieval Period " of Montpellier. All vestige of the magnificent halls and hôtels of the Renaissance has disappeared. The decline in the fortunes of the town during the fifteenth and sixteenth cen-

turies may be traced in the collapse of the Levantine trade and the general stagnation of trade and commerce in Bas Languedoc consequent on the English wars and the religious wars that followed. Also the annexation in 1481 of Marseille by the kingdom of France spelt the death knell of the smaller ports along the coast which were already handicapped by the silting of channels and the closing of lagoon mouths by sandbanks and bars. The unrest culminated in 1567 when Montpellier became a Protestant town and all the Catholics were evicted and all the places of worship were destroyed. It was then that Nôtre Dame des Tables was razed to the ground and its long association with the peoples of Montpellier came to an end.

Amnesty was given to the Protestants by the peace of 1622. And from then



Montpellier. A. Cathedral. B. Medical School. C. University. D. Palace of Justice. E. Nôtre Dame des Tables.

on Henri IV, whose name is still cherished by the people, by his active interest in the town and his leniency towards the erstwhile rebels did much to restore civic prosperity and well-being. It was during his reign that the botanic gardens were laid out, one of the earliest collections of plants in Europe and one associated since with many famous naturalists. The university, which had suffered under the Protestant occupation, was reorganised and many new chairs were created in the medical and other schools. In the same century Colbert strove to do all in his power to revive the flagging industries of Languedoc, for on their activity rural and urban centres, directly and indirectly, depended. His most far-reaching reform was the creation of the port of Sète in 1661 to serve as an outlet for the rich hinterland and to supersede the obsolete little coastal and river ports.

This active policy in town and countryside initiated the second "grand"

period in the history of Montpellier. The splendour of this rebirth lives for posterity in the lovely eighteenth-century residences and in the monuments and fine ornamental gardens with which the town was graced. These grandiose schemes were consciously planned and executed ; for Montpellier, as seat of the Governor and meeting-place of the annual session of the " États de Languedoc," held the position of leader and social centre of the south. The winter season of official business and organised festivals drew visitors from all over Europe, but more especially from Britain. Thus the foreign visitors added their elegance to the already colourful scene. Many also, ailing and in ill health, came to seek the opinion and treatment of the specialists of the famed medical school. One may imagine that part of the cures effected lay in the healing rays of the Midi sun !

At the same time industry and commerce flourished, and the banking and financial houses, rooted in the middle ages, expanded and increased their capital. The industries were much the same as those practised in the earlier centuries ; textiles still headed the list, but now besides the levant cloth, blankets and handkerchiefs were manufactured. In the making of chemicals and medicines the old tradition persisted but now on a greater and more scientific scale ; likewise the old industry of distilling essences from aromatic herbs grew into a perfumery industry so considerable that Evelyn finds room to mention it in his *Diary*.

This pre-eminent position was not long to endure. The opening of the new world, the shift of industry to the coalfields, brought a new economic era into being ; while in France the Revolution changed the face of government and deprived Montpellier of her rôle as premier administrative centre of the south. Throughout Languedoc the traditional industries decayed and disappeared ; in the rural areas the peasants forsook the old subsistence economy based on wheat, and concentrated on growing the vine until the whole plain was devoted to this monoculture.

This change in the rural economy was in a way the saving of Montpellier. Owing to her function as market centre for the biggest wine-producing Département in France (22 per cent. of the total production) the town has experienced a rapid growth of population and a period of prosperity equal to that of the eighteenth century. Her claim to be the wine market of the south has not gone undisputed. Béziers overshadows her, and other smaller centres such as Pezénas, Frontignan and Lunel have no little share in the commerce of wine. It is perhaps because of these rival markets, coupled with her poor railway connections, that her increase in population, 56 per cent. since 1866, has been less spectacular than that of Béziers (158 per cent.) or Narbonne (85 per cent.).

Modern tendencies in the wine trade show that the position of the chief wine markets like Montpellier and Béziers are being undermined. Large Paris firms before the war were buying direct from the producers and shifting the wine directly by road. Today these two towns handle only 50 per cent. of the wine produced in their respective areas. It is probable that the amount will decrease further as road transport becomes more common.

Already Montpellier is seeking new fields of activity by developing small industries compatible with her agricultural environment. But this is a poor comparison with the past, and makes it harder to reconcile the knowledge of her once pre-eminent position in Bas Languedoc with her present position of local market centre of a restricted hinterland. Were it not for her continued leadership of the intellectual life of the south of France, Montpellier would be in a sorry position, for she is without even those classical antiquities with which her neighbours demonstrate the glories of their past. Small wonder then that dwellers in streets or towns of the name Montpelier show no knowledge of the city whose name they adopted.

ON DAVID THOMPSON'S TRAIL IN THE BRAZEAU COUNTRY AND FROM BOGGY HALL ON THE NORTH SASKATCHEWAN TO THE PEMBINA AND ATHABASKA

By G. T. Welsh

[The exploration of Alberta and British Columbia, and of Montana, Idaho, and Washington, was but part of the work accomplished by one of the most eminent of Canadian travellers and surveyors. David Thompson, born in Westminster in 1770, was a Pupil in the Grey Coat School until 1784, when he entered the service of the Hudson's Bay Company and sailed to Canada. During the next twenty-eight years, in the employ of the Hudson's Bay Company and then of the North-West Company, he not only undertook extensive and extremely accurate surveys, but recorded astronomical and meteorological data as well as vocabularies of many Indian tribes. Between 1816 and 1826, as Astronomer to the International Boundary Commission, he surveyed part of the boundary line between British North America and the United States. When he had retired to Montreal, he wrote a narrative [1] of part of his life-work, a narrative that is not merely of historical interest, but provides good reading at the present day and reveals his great qualities. Thompson died in 1857, in Longueuil, opposite Montreal. The work he accomplished in north-western America was not adequately appreciated until long after his death, but his maps and note-books form his permanent memorial.—Ed.]

Since David Thompson was turned back by the Piegan Indians in 1810, on his way up the North Saskatchewan to Howse Pass to trade with the Indians on the Columbia River, nobody in the locality seems to have any definite idea of his new route from Boggy Hall, on the North Saskatchewan, to the Pembina River, and from there to the Athabaska, and of his trials and privations in that stretch of country. There is a meagre account of the starting point of his trail. Having long been interested in David Thompson and his travels, I obtained a copy of his own account and observations, and during my work as travelling veterinarian in the Brazeau and Pembina country I at last found the trail and travelled over part of it, hoping to cover more of it later. Previously I had crossed this trail dozens of times without being aware of it.

Leaving my home near Onoway, Alberta, early one September morning [1942], with my saddle and pack ponies and necessary equipment, I jogged along, making a call here and there, and if necessary, doing some work on the way, to horse, or cow, or other animal. Passing through Duffield, I entered the Indian Reserve, meeting some of my Indian acquaintances on the way. The trail through the Reserve took me to Wabamun Lake where I swung south to Highvale, where I usually camp for the night, making thirty miles and over for my first day's journey. Next morning, off again as early as I could, I passed Low Water Lake, now ditched and drained by the government, and forming an extensive and productive hay meadow. After some more calls, I reached Rocky Rapids, and drove on to Drayton Valley, making camp again about forty miles from Highvale. The morning after, I went on to Violet Grove, and not far from there started on my trip into the Brazeau and Pembina wilderness.

Going west from Violet Grove about five miles, I entered the bush and, travelling about ten miles through a fairly level country of jackpine, spruce, alder, willow and poplar, came to Jackpine Springs, a favourite camping and hunting place, situated in the pines and provided with an abundance of firewood and clear, cold water. A few miles further on is Starvation Creek, and beyond this, Three Crossing Creek, a stream which has to be crossed three times within a short distance and which runs along the foot of a deep ravine. Climbing out of the ravine, one passes through undulating poplar and jackpine country until one comes to Boggy Hall, where the North-West Company had a

trading post until it was abandoned (1808) on account of scarcity of beaver in the district. Swampy Ground Assiniboines and Strong Wood Crees formerly traded here. Nothing is left of the old buildings except traces of the old chimneys, or ovens, of which pieces of bricks and clay can still be found embedded in the turf. Boggy Hall is situated on a Flat, not far from the Saskatchewan River, a very pretty spot, with high banks to the north and west and with the river bank to the east, all covered with different species of trees, their foliage changing colour, the deep green of the spruce contrasting with poplar and birch and a red expanse of willow on the Flat.

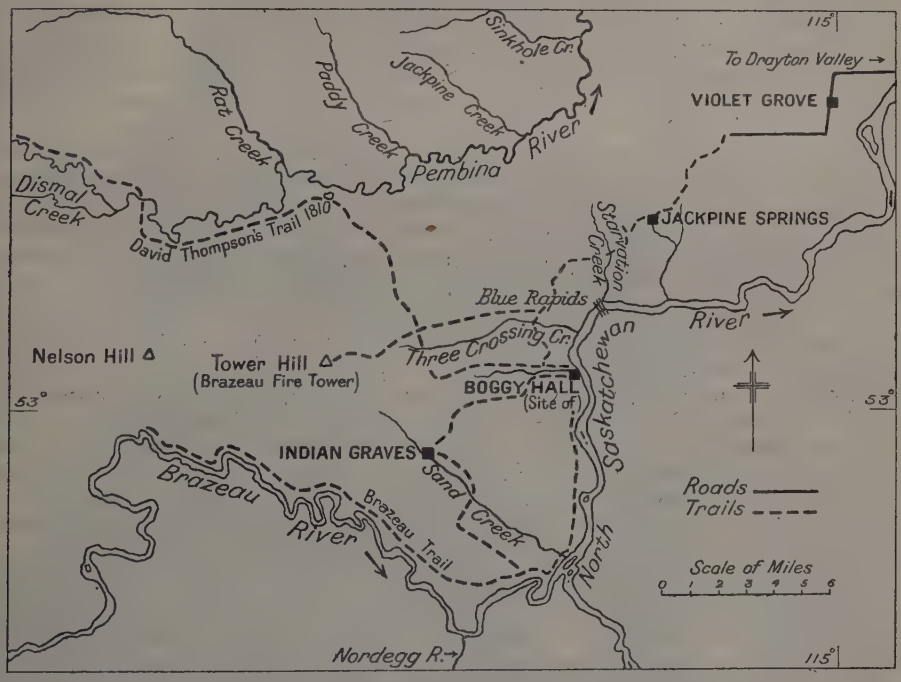
Not long before Thompson started on his journey to the Columbia River from here, he was camping south of Boggy Hall in a thicket of pine trees near the Saskatchewan River. When he was turned back from Howse Pass by the Piegan Indians, he had sent a messenger to Rocky Mountain House [a trading post of the North-West Company and Thompson's home for several years] to request the trader, Alexander Henry, to meet him here and have a consultation as to his new route. Henry came and stayed for the night, leaving next morning for Rocky Mountain House over an old Indian trail which crossed the Brazeau River. As I was eager to find where Thompson had camped, I spent nearly a day looking for the site. Not being able to find any trace of it, I followed the old Brazeau Trail to the mouth of the Brazeau, which no doubt was Henry's route, as it is the only old Indian trail in the vicinity. This old trail meanders through fairly level country, wooded with poplar, jackpine and alder, crossing some small creeks occasionally, and only once in a while there is a glimpse of the Saskatchewan River, until the trail emerges from the bush on the edge of a steep bank and affords a good view of the confluence of two wonderful rivers, the Saskatchewan and Brazeau.

Before descending the bank I surprised a doe deer with two lovely fawns on the side of the trail. Unfortunately I had no camera with me. Climbing down to the bottom of the bank, I came to Sand Creek, a fair-sized creek which runs into the Saskatchewan a short distance below the mouth of the Brazeau. After crossing Sand Creek I kept to the northern bank of the Brazeau River and eventually reached a " hay flat " where I staked my ponies and picked out a sheltered spot for my shed tent. After lighting the camp fire in the old style, as in Thompson's time, with flint, steel and punk, and getting water from the Brazeau, I soon had my kettle boiling and embers for baking bannocks. Supper over, I fixed up an alder pole with hook and line and, with a piece of bacon for bait, wandered along the river bank, casting in likely places. The water of the Brazeau, being of dirty grey colour and silty, I did not get a bite, and about to try somewhere else, I looked around. Across the river and coming down to the water there appeared an elk cow and calf, and behind them a yearling elk. I dropped my alder pole, and sitting still, witnessed one of the prettiest sights I have seen on many trips in the bush country. The mother elk walked out into the river till the water reached her knees, and after her the calf. After smelling the air currents she started to drink, the calf nuzzling and rubbing its head against her body. After quite a while, the calf walked out ahead of mother straight into the current and, without any hesitation, started to swim across, mother following on behind. Landing not over thirty yards from where I was squatting on the bank, they both looked at me and tried to get my scent. Meanwhile, the yearling started to swim across, but when approaching me, must have obtained a whiff of man scent, because he made a right-about turn and, with much fuss and splashing, swam back to his starting point and trotted into the bush, barking Erck ! Erck ! Erck !, either calling the mother and baby or giving them warning. They just moved off as if nothing had happened.

Next morning I made an early start for Boggy Hall. Climbing up a very steep bank, I obtained a lovely view of the rising sun, with miles and miles of spruce and poplar timber intervening. There were blueberries and cranberries in profusion, and bear signs were very evident. Travelling west I nearly ran into a large bull elk and a cow out for their morning promenade on the Brazeau

Trail. A mile or two further on I turned off the old trail, which follows the course of the Brazeau westwards, though in places no trail is visible, through open country, with a few jackpines here and there. Thompson and Henry travelled near here in 1810, and Thompson, when turned back by the Indians and in danger of his life, crossed here somewhere to reach Boggy Hall.

Travelling in a northerly direction now, I crossed Sand Creek again and, following the creek for some miles, came to a number of Indian graves in a very desolate spot, about thirty-five miles from any settlement. These Indians died during the influenza epidemic of 1918. Moving on through poplar and jackpine, I sighted another bull elk, with two cows this time, and then, through spruce and climbing a hill, I obtained a view of miles of forest in every direction. Descending, I reached more level country and eventually reached the Boggy Hall Flat, where I camped for the night. On October 29, 1810, Thompson left this point with twenty-four loaded pack horses and twenty-four men in all. In



Brazeau, Pembina, and North Saskatchewan Rivers, Alberta.

his journal he says, "At 10 A.M. we were all ready and set off, pray Heaven to send us a good journey."

Starting early next morning, I followed Thompson's trail and went due west along a creek which empties into the Saskatchewan River a short distance below the old trading post. The trail at the outset is very steep, and I had to lead my ponies for quite a way, and even then they had difficulty in following me along the northern bank of this small creek. Further on there was better going, but parts of the trail have disappeared owing to landslides. After about three miles, still going west, I crossed the road to Violet Grove Settlement and kept on into flat, muskeg country. Old Indian camps were much in evidence, with their meat-drying racks, tepee poles and sweat lodges still standing, though some looked on the point of falling down. In some places this path is quite plain, and in others, like the Brazeau Trail, very hard to follow, as there are so many game trails branching off in every direction and there are no blazes at all on any of the trees. Keeping on, still along the creek, and remembering Thompson's

directions, I at last crossed it to the south and then swung west again. While going for a mile or so through rough country, with much windfall underfoot, I startled a big cow elk and, shortly after, some deer. Heading south-west through timber on rising ground and then downhill, I reached a creek mentioned by Thompson, which he followed for some miles. Not far from here his hunters killed two buffalo cows and a grizzly bear, and he camped for the night in a willow swamp within a mile or so away, the first day out from Boggy Hall. I could picture his cavalcade of pack horses, each with a load weighing from 180 to 240 pounds, but I could find nothing to mark their passing all these long years ago.

Following this second creek nearly due north, I crossed it again and again —very bad going for the two ponies, as the banks are steep and sideslips are quite easy. Getting out of this, I ran into a soft, quaking muskeg and walked ahead hoping I would not lose a pony, or both, which would have meant a serious predicament. However, we got across safely and followed on North 20 West, keeping the creek in sight. Crossing some more swamp and low-lying land, I approached the creek again. As it was hard to follow, I found at last some good grazing for the ponies and decided to camp near a former beaver dam. From here on there is no trail, indeed there had been none for the last mile or so.

I now leave Thompson's trail, but part of his journey from here on may be briefly retold. He left the dried-up bed of the little brook and went on up rising ground where he camped again, giving the horses a good rest until the next morning : " horses much fatigued owing to the road being bad." In the morning, getting to the top of this rising ground, Thompson went down to a small lake near the Pembina River. From this lake he kept west and, after crossing a brook, camped on a small flat, where one of his hunters killed a doe deer, which gave them a meal of fresh meat again. Crossing the Pembina River somewhere near here, he travelled in a westerly direction until, arriving at another creek, he decided to camp. The ground further on being too soft for the horses, the route had to be changed, and, after a day or two, the party proceeded North 40 West and camped at the edge of a swamp. The men were hungry and could not kill anything to eat, the ground being too hard for animals to make tracks in the absence of snow. As the men had nothing but a dram of rum in two days, Thompson sent back for provisions, and when they came, he allowed each two men a double handful of beat meat, with the side fat of buffalo. (Beat meat is buffalo or moose meat cut into thin slices, then exposed to sun and wind on a drying rack of small poles ; when dry, the meat is crushed and pounded between stones to a powder which is eaten without any other preparation. Beat meat thus differs from pemmican, which has grease added and, sometimes, choke berries, or saskatoon berries.) They at last found a way through the swamps and muskegs, though having much difficulty in clearing a road through the dense forest. As Thompson says, " we have now left the Stone Assiniboine Indian Road we have been so long following." Picking their way through this wilderness, and charting the route by a small compass, they at last had better going and better luck with their hunting, as the snow had come and they were able to kill buffalo and moose as they travelled along. Thompson mentions passing a place where there were four tents at a former Stone Indian camp. Coming to a creek bearing north, he decided to follow it and so, eventually, reached McLeod's River. Crossing and recrossing this river, the party reached a point near the present Lake Obed, and then followed a brook which led them to the Athabaska River. As he reached it, Thompson remarked : " Thank Heaven."

REFERENCE

[1] David Thompson's Narrative of his Explorations in Western America, 1784-1812. Edited by J. B. Tyrell. *The Publications of The Champlain Society, XII.* Toronto, 1916.

POTATO
PLANTING,
AN UIG, LEWIS

KNOCKCROME,
JURA

LAND UTILISATION IN THE HIGHLANDS AND WESTERN ISLES

Review by Arthur Geddes

These useful and readable Reports [1] show how much can be done to add to knowledge by reconnaissance of the ground, following the actual survey of fields by school children and teachers or by students, when coupled with a balanced geographical compilation of existing statistics and materials. A valuable addition to our regional literature, these Reports should encourage further and fuller studies. Very sensibly, although they have retained the county basis, the editor and authors, in maps and text, have pooled the general information for the entire Highland mainland in utilising that already published for Caithness and Sutherland, together with the adjacent Lowland farming tracts included in the counties named. The addition of a detailed table of contents would greatly facilitate use, however, both in rapid reading and in reference. The accompanying maps published include One-inch Sheets 28, 53, 59 and 60, besides the generalised map (approximate scale, ten miles to one inch).

The agricultural maps in the text follow up the plotting of statistics for administrative units by interpretative maps. These show the units of homogeneous agricultural land-use, areas for which " tract and sub-tract " might prove useful terms, instead of the overworked " region and sub-region " or of the too non-committal " area." There is far more work, and a greater value, in such maps than the small reduced scale, necessitated by economy in reproduction, would suggest to the layman—a constant difficulty for the geographer. Have the Land Utilisation Survey and its educational collaborators considered the issue of cheap full-scale photoprints, in limited numbers for local (and specialist) use? A review of changes in land use during the inter-war period is combined with a wider historical perspective and tentative forecast. The population is not forgotten, and the authors write with a sense of human values. For a war-time production, errors and misprints are creditably few. The Reports are to be warmly welcomed.

With regard to emphasis, a few points may be mentioned. It is pointed out that the comparatively high amount of sunshine in early summer in the Outer Hebrides permits of barley (especially on the sandy " machair land ") ; but the same is true of the capes of the inner isles and mainland, by contrast to the sides of the in-reaching western sea lochs, round the rainier loch-heads. Agriculturally, the term " crofting " is too loosely used here (as elsewhere). Some distinction is called for between what might be termed (*a*) the part-time " township crofting " of the Outer Isles and North-West, characterised by minute holdings and common grazings and associated with seasonal fishing or kelp-making, and latterly with weaving and with much " temporary migration " ; and (*b*) " individual crofting," found further south and east, which ranges from whole-time small farming to part-time small holding, generally associated with other work on the spot, such as " estate work," trapping or forestry.

[1] *The Land of Britain : The Report of the Land Utilisation Survey of Britain.* Edited by L. Dudley Stamp, B.A., D.Sc. Parts 9-12. *The Highlands of Scotland : Ross and Cromarty, the Hebrides, Argyll and Perthshire.* By S. W. E. Vince, B.Sc. (Econ.). *The Mainland of Inverness.* By C. J. Hunt, B.Sc. (Econ.). Part 13. *Buteshire.* By L. Dudley Stamp, B.A., D.Sc. London : Geographical Publications Ltd., 1944. *Price* 10*s*.

NOTES AND REFERENCES

EUROPE

THE LEWIS ASSOCIATION was formed in 1943 " to survey and study the social and economic needs of the Island of Lewis, and to draw up progressive plans of development." The existence of this Association has already had a bracing effect on the public life of the Island, and the painstaking work of the various committees appointed is reflected in *The Lewis Association Reports*. The first number contains a general economic survey, and deals with the historical background to the industries, the people (including vital statistics), and employment, the industries (agriculture, fishing, tweed industry, new industries, e.g. bricks, peat utilisation). Conclusions and recommendations are concerned with the planning of Stornoway and of rural Lewis ; there is an interim report on public health. The second number of the *Reports* deals with external transport and the majority and minority reports on the Harris tweed industry, and a memorandum submitted in 1944 to the North of Scotland Hydro-Electric Board.

THE MINERAL RESOURCES OF THE LOTHIANS. In a *War-time Pamphlet* (No. 45, April 1945. Pp. 46. Mimeographed. *Price 2s.*) issued by the Geological Survey of Great Britain, Dr. A. G. MacGregor has provided an economic summary and guide to sources of information relating to the rocks and minerals of economic importance, to peat and associated deposits, and to the hydrological importance of the various formations occurring in the Lothians. An introductory chapter, dealing with general geological principles and giving an outline of the geological history of the Lothians, has been written for those unfamiliar with geological methods and ideas. The lucid presentation of the data is enhanced by a diagram showing geological succession and the origin of the principal mineral resources and by a geological map and a map showing the superficial deposits. Sixty-seven bibliographical references and a complete list of the Geological Survey's War-time Pamphlets are added.

NOTES ON SOME GLACIAL FEATURES IN NORTH-EAST DERBYSHIRE. By A. C. Dalton. *Proceedings of the Geologists' Association*, 1945, 56 (*1*) : 26-31. 2 maps.

A GROWTH MAP FOR NORTH-EAST LONDON DURING THE RAILWAY AGE. A map of the built-up areas at different dates, based on the one-inch O.S. sheets, and a generalised geological sketch map illustrate an article by H. Rees (*Geographical Review*, 1945, 35 (*3*) : 458-465), which deals with the development of the region approximately delimited by Ermine Street, Enfield, the Becontree Estate, and the Thames.

REPLANNING LONDON. By L. Dudley Stamp. *Geographical Review*, 1945, 35 (*4*) : 665-667.

PRESERVATION OF COASTAL AMENITIES IN WALES : A SURVEY. By T. Alwyn Lloyd. *Journal of the Town Planning Institute*, 1945, 31 (*5*) : 164-171. Discussion : 171-175.

THE AGRICULTURAL REGIONS AND RURAL POPULATION OF IRELAND. In *Bulletin* No. 2 of the Geographical Society of Ireland (1945, pp. 21-30. 2 figs.), T. W. Freeman discusses the distribution of farms by size and the proportion of workers per farm, and gives a summary of conditions in the ten agricultural regions : Highlands and Lowlands of Donegal ; Drumlin and Drift Belt ; West Mayo and West Galway ; Central Lowland—east and west sections ; Clare, Limerick, and North Kerry ; Kerry and West Cork ; Valleys and Uplands of Cork ; Suir, Nore, and Barrow basins ; South-eastern Uplands and Lowlands.

OLD AND NEW KILCULLEN. A note by O. Purser on settlement at Kilcullen, on the Liffey, and Old Kilcullen, some two miles south, is accompanied by sketch maps. (*Geographical Society of Ireland, Bulletin* No. 2, 1945 : 31-33.)

LOW-LEVEL SURFACES OF EROSION IN THE WICKLOW MOUNTAINS. Following the technique employed by Professor Ogilvie [*S.G.M.*, 1944, 60 (*2*) : 42-45], J. P. Haughton has mapped the distribution of land in the Wicklow Mountains which has a slope of less than 1 in 40 in any direction (*Geographical Society of Ireland, Bulletin* No. 2, 1945 : 34-38). It would appear that three major levels can be recognised : 200 feet, rising gradually from 100 feet in the east to about 300 feet in the west ; a less well marked surface at 400-500 feet ; and traces of level land at 700-900 feet. These areas are discussed in some detail.

REGIONAL PLANNING IN THE CANTON OF ZÜRICH. The complex problems arising from the rapid increase in population, industrialisation and urbanisation in the canton of Zürich have led to the completion of a detailed survey and the recent establishment of a regional planning bureau. The development, aims, and organisation of town and country planning of this region are authoritatively described by H. Peter in a publication issued by the *Naturforschende Gesellschaft in Zürich* (Zürich : Gebrüder Fretz AG., 1945. Pp. 56. 30 figs). The recognition of the fundamental (and economic) value of preserving, or enhancing, natural and cultural amenities is noteworthy. Areas to be preserved include certain lake shores and a considerable zone along the left bank of the Rhine. Erections which do not harmonise with the landscape are to be avoided or removed (e.g. pylons in the vicinity of the Greifensee). The publication is illustrated by maps, diagrams, and photographs.

HUNGARIAN TRAVELLERS AND EXPLORERS. In *Boletim da Sociedade de Geografia de Lisboa* (1945, No. 5-6 : 199-205), F. Marjay briefly describes the activities of Hungarians in different parts of the world—from Eskandeli, Jesuit missionary in China in the fourteenth century, to scientific explorers in Central America during recent years.

COMMUNICATIONS IN THE BALKANS. In a publication (*Quelques notes sur les communications dans les Balkans*) issued by the Bulgarian Academy of Science (47 pp. 19 maps and diagrams. Sofia, 1945), L. Bochkoff surveys the history, distribution, functions, and political implications of railways in the Balkans, and of the Aegean ports. Necessary bridges across the lower Danube are also discussed.

ETHNIC GROUPS IN CITIES OF THE SOVIET UNION. By C. D. Harris. *Geographical Review*, 1945, 35 (*3*) : 466-473. 1 fig.

ASIA

PASTORAL LIFE IN TURKEY. Pastoralism in Turkey under settled and nomadic conditions, and transhumance in mountain regions, have been studied by J. Frödin (*Geografiska Annaler*, 1944, 26 (*3-4*) : 219-272. 16 figs.), information about eastern Turkey being based on direct observations made in 1936 and 1939. The paper is illustrated by photographs and by sketch maps of pastoral regions in northern Anatolia, distribution of permanent and seasonal settlements forming economic units in the steppe region, routes of Kurdish tribes between Van Gölü and the upper Tigris, and distribution of summer camps on the slopes of Erciyes Dagh (Central Anatolia) in relation to permanent settlements at a lower level.

THE FUTURE OF THE BEDOUIN OF NORTHERN ARABIA. By W. G. Elphinston. *International Affairs*, 1945, 21 (*3*) : 370-375. Sketch map.

THE BRITISH AND SOUTH ARABIA. By H. Ingrams. *United Empire*, 1945, 36 (*5*) : 173-178.

THE HADHRAMAUT IN TIME OF WAR. By H. and D. Ingrams. *Geographical Journal*, 1945, 105 (*1-2*) : 1-27. 24 photographs. 1 map. Discussion : pp. 27-29.

THE WATERWAYS OF IRAQ. By Lt.-Col. Lionel Dimmock, O.B.E. *Journal of the Royal Central Asian Society*, 1945, 32 (*3-4*) : 307-313. Sketch map.

THE NEPAL BASIN. The approach to the region enclosed by the northern and southern spurs of Gossain-Kund in central Nepal, and the topography and geology of the basin, are briefly described by P. C. Chakravarti in the *Calcutta Geographical Review* (1945, 7 (*1*) : 1-5. 6 figs.).

SOME ASPECTS OF THE GEOMORPHOLOGY OF THE RANCHI PLATEAU. By S. C. Chatterjee. *Calcutta Geographical Review*, 1945, 7 (*2-3*) : 31-35. 7 figs.

THE ORIGIN AND GROWTH OF CEYLON'S TOPOGRAPHICAL MAP. By R. L. Brohier. *Ceylon Geographical Society : Bulletin*, 1945, No. *1* : 2-7.

SOME OBSERVATIONS ON CEYLON WEATHER AND CLIMATE. By L. A. D. I. Ekanayake. *Ceylon Geographical Society : Bulletin*, 1945, No. *2* : 1-5.

THE BURMESE VILLAGE. By O. H. K. Spate. *Geographical Review*, 1945, 35 (*4*) : 523-543. 17 figs.

THE KERAYAN-KALABIT HIGHLAND OF CENTRAL NORTH-EAST BORNEO. This little-known region, mapped on a scale of 1 : 200,000 by the Netherlands Indies Forest Department in 1934-35, has been resurveyed to a certain extent by geologists for the Bataafsche Petroleum Maatschappij. W. F. Schneeberger, who was engaged on the latter survey in 1939, describes the region, with special reference to its hydrology, climate, vegetation, and fauna, in *The Geographical Review* (1945, 35 (*4*) : 544-562. 24 figs.), with a morphological map (scale : 5 km. to 1 cm.) of the Highland and adjacent areas.

THE CLIMATES OF CHINA. By Professor Liu-en-lan. *Calcutta Geographical Review*, 1945, 7 (*2-3*) : 27-31.

AFRICA

THE FRENCH IN TUNISIA. By D. V. McKay. *Geographical Review*, 1945, 35 (*3*) : 368-390.

TYPES OF NATIVE LIFE IN TRIPOLITANIA. Physiographical and historical factors of Tripolitania are outlined, and life of the villagers and nomads is described, by J. Despois in the *Geographical Review* (1945, 35 (*3*) : 352-367. 13 figs.), with a map showing the main regional divisions and tribal distribution, a rainfall map, and a section across Tripolitania from north to south.

THE LIBYAN DESERT. War-time exploration with the Sudan Defence Force in the Libyan Desert, 1941-43, is reviewed in a paper by Captain J. W. Wright, R.E. (*Geographical Journal*, 1945, 105 (*3-4*) : 100-111. 10 photographs. 1 map), which includes notes on the methods of survey used. An area of about 100,000 square miles, centred on the Kufra oases, was mapped. Existing maps were corrected and much detail added, and large-scale maps were made of the main Kufra oasis (1 : 20,000) and of Gialo (1 : 25,000).

NOTES ON THE JOURNEY FROM ROSETTA TO CAIRO IN THE SEVENTEENTH AND EIGHTEENTH CENTURIES. By R. Fedden. *Bulletin de la Société royale de géographie d'Égypte*, 1945, 21 (*2*) : 99-107.

THE POPULATION OF THE EGYPTIAN OASES. Measurements of inhabitants of Siwa, Baharia, Farafra,Dakhla, and Kharga have been recorded in detail by Mohamed Mitwalli (*Bulletin de la Société royale de géographie d'Égypte*, 1945, 21 (*2*) : 109-138. 31 graphs). Comparison with data from other sources tends to show that the northern group of the oasis population (Siwa, Baharia, Farafra) is of Arab or Berber origin. The cephalic index for Farafra men resembles that of Carthaginian skulls, confirming a traditional connection with Tunis and western Tripoli. In the south, the Dakhla and Kharga people racially resemble the Nile Valley Egyptians. In general, the Libyan element is represented in each of the five centres, but in decreasing proportion southwards.

THE NIMBA NATURE RESERVE. The first nature reserve in French West Africa was established in 1944 and comprises the portion of the Nimba massif in southern French Guinea and the Ivory Coast, adjoining Liberia. The vegetation of this Pre-Cambrian range, which rises to 1600-1700 metres in French Guinea, is of considerable interest, and is described in an article by A. Schnell in *Notes Africaines* (1945, No. 26 : 1-4).

LOURENÇO MARQUES. The development of Lourenço Marques, from the establishment of the Portuguese fort in 1544 to the present-day capital city, is outlined by J. de Oliveira Boléo in *Boletim da Sociedade de Geografia de Lisboa* (1945, No. 5-6 : 217-227).

CAVES OF THE MUIZENBERG RANGE. Numerous caves near Kalk Bay and Muizenberg, north of Simonstown, are described by J. C. W. Moore in *The Journal of the Mountain Club of South Africa* (1945, No. 47 : 7-22. 2 figs. Sketch map). By 1940 there were nearly seventy known caves, and others have been discovered since.

AMERICA

PEAT IN CANADA. By A. A. Swinnerton. *Canadian Geographical Journal*, 1945, 31 (*1*) : 18-29. 34 illustrations.

TOWN PATTERNS ON THE GULF OF SAINT LAWRENCE. By Griffith Taylor. *Canadian Geographical Journal*, 1945, 30 (*6*) : 254-275. 14 figs. 16 photographs.

THE SEVEN AGES OF TOWNS. The concept of the ages of various landscapes, introduced by W. M. Davis, can be used in comparing many common features of towns. Infantile, juvenile, adolescent, early mature, mature, late mature, and senile stages may be distinguished, from the haphazard distribution of houses and shops characterising infantile towns to the abandonment of considerable areas in a shrinking, senile city. An article by Professor Griffith Taylor (*Economic Geography*, 1945, 21 (*3*) : 157-160. 1 fig.) deals with the application of this concept to the town pattern in Southern Ontario.

HAMILTON AND ITS ENVIRONS. By J. W. Watson. *Canadian Geographical Journal*, 1945, 30 (*5*) : 240-252. 12 figs. 11 photographs.

DAVID THOMPSON. The exploration and survey of what is now Western Canada by David Thomson (1770-1857) is referred to in a biographical note by L. J. Burpee (*Canadian Geographical Journal*, 1945, 30 (*5*) : 238-239). [Cf. p. 89.]

LAND USE POSSIBILITIES IN MACKENZIE DISTRICT, N.W.T. By J. L. Robinson. *Canadian Geographical Journal*, 1945, 31 (*1*) : 30-47. 29 photographs. 6 climate graphs. Map.

TREES FOR THE ALEUTIANS. In an article in *The Geographical Review* (1945, 35 (*3*) : 418-423), D. Bruce and A. Court review climatic conditions and the natural establishment of trees in the Aleutian Islands. Shipment of young trees " down the chain " has been stimulated by the Alaskan Defense Command, and the afforestation programme is being continued. On Kodiak and Umnak about 5000 out of some 11,000 trees planted in 1942 are still surviving, and, at least, the plantings represent a valuable experiment.

PHYSIOGRAPHIC DIVISIONS OF THE COLUMBIA INTERMONTANE PROVINCE. By O. W. Freeman, J. D. Forrester, and R. L. Lupher. *Annals of the Association of American Geographers*, 1945, 35 (*2*) : 53-75. 2 figs. 1 map.

EVOLUTION OF METROPOLITAN DETROIT. By B. Hudgins. *Economic Geography*, 1945, 21 (*3*) : 206-220. 6 figs.

POPULATION OF SOUTHERN UTAH. Whereas in most parts of the United States the pioneers individually selected home sites which were widely scattered, colonisation by the Latter Day Saints in Utah was characterised by the formation of village settlements surrounded by extensive areas of uninhabited land. The foundation and development of such villages in southern Utah illustrate the control exercised by topography and climate. Most of the present inhabitants are the descendants of the Nordic pioneer settlers and, being members of the Mormon Church, have a common interest in the development of the settlements. In a study of the geography, history, and activities of these settlements, H. E. Gregory (*Economic Geography*, 1945, 21 (*1*) : 29-57. 1 sketch map) gives a detailed account of the villages founded at the base of Hurricane Cliff and in the principal valleys of southern Utah, and also in the grazing area between the Vermilion Cliffs and Colorado River in Arizona.

BIRMINGHAM, ALABAMA. A supplement to the *Vierteljahrsschrift der naturforschenden Gesellschaft in Zürich* (1945, 90 (Suppl. *3*) : 1-40. 9 figs.) is devoted to a study of Birmingham, by H. Boesch, with special reference to regional topography and geology, farming types and land utilisation, technological and economic conditions of the heavy industries, markets and communications, and to the urban areas and population, with relevant statistics.

CLIMATES OF TEXAS. By R. J. Russell. *Annals of the Association of American Geographers*, 1945, 35 (*2*) : 37-52. 2 figs.

THE SECOND PAN AMERICAN CONSULTATION ON GEOGRAPHY AND CARTOGRAPHY was held in Rio de Janeiro, August 14 to September 2, 1944. The proceedings are surveyed by R. H. Randall in *Bulletin of the Pan American Union* (1945, 79 (*1*) : 11-16. 2 figs.). The nations represented were urged to connect their systems of triangulation and levelling across their borders, and progress in topographic mapping and hydrographic charting was reported. Among other items may be mentioned the adoption of the 1 : 1,000,000 military aeronautical chart on a standard sheet size of 22 by 29 inches as the standard chart for the American hemisphere, and an exposition of maps, charts, and survey data produced by the various American nations.

THE INTER-AMERICAN HIGHWAY. Difficulties in the construction of the overland route from Laredo, on the Rio Grande, to Panama are described by E. W. James (*Journal of Geography*, 1945, 44 (*4*) : 182-192. 4 figs.). Condition and length of the different sections, totalling 3356 miles, are tabulated. One of the most difficult sections crosses the continental divide at an elevation of 10,931 feet in extremely rough terrain in Central Costa Rica.

ECONOMIC AND SOCIAL GEOGRAPHY OF TAMAULIPAS. The geographical and agricultural regions of the State of Tamaulipas, with special reference to production of crops and live-stock, are reviewed by Professor L. G. Treviño in *Boletín de la Sociedad Mexicana de Geografía y Estadística* (1944, 59 (*5-6*) : 315-342). The paper contains a useful list of minerals, plants, and domestic animals, and seven sketch maps illustrate the distribution of land, natural regions, and production of maize, sugar, and other crops.

JOURNEYS IN THE NORTHERN ANDES. By J. Hanbury-Tracy. *Geographical Journal*, 1944, 104 (*5-6*) : 145-165. 13 photographs. 3 maps.

TRANSPORTATION IN THE COLOMBIAN ANDES. By H. L. Colvocoresses. *Bulletin of the Pan American Union*, 1945, 79 (*7*) : 393-399. 6 figs.

THE NORTHERN HIGHWAY OF PERU. A journey from Lima to Huánuco and by raft down the Huallaga River to Yurimaguas [cf. *S.G.M.*, 1940, 56 (*2*) : 88-89], and the return journey thence by the Northern Highway over the Calla-Calla Pass (12,170 ft.) to the Pacific coast at Trujello, are described by C. Sandeman in the *Geographical Journal* (1945, 105 (*3-4*) : 81-100. 15 photographs. Map). In spite of the hardships incidental to the route, the author was engaged in botanical research, the main purpose of the expedition.

GEOLOGICAL INSTITUTE OF PERU. A Geological Institute is being established under government auspices in Peru, its major functions being the preparation of a geological map and of an inventory of mineral resources, and co-operation with other geological and geographical organisations in the Americas. (*Bulletin of the Pan American Union*, 1945, 79 (*3*) : 170.)

BOLIVIAN OIL DEVELOPMENT. A map of the Bolivian petroleum zones illustrates a note, in *Bulletin of the Pan American Union* (1945, 79 (*8*) : 475-477), compiled from South American technical periodicals.

OCEANIA

THE ISLAND OF NEW GUINEA. By L. Evelyn Cheesman. *Proceedings of the Royal Institution of Great Britain* (1943), 1945, 32 (*149*) : 549-555.

THE RELATIONSHIP OF THE AUSTRALIAN CONTINENT TO THE PACIFIC OCEAN—NOW AND IN THE PAST. In the Clarke Memorial Lecture (1944), W. H. Bryan critically reviewed rival hypotheses concerning the structural boundary of the Pacific basin in the south-western quadrant and discussed the limit of the original Australasian mass (*Journal and Proceedings of the Royal Society of New South Wales for 1944*, 1945, 78 (*1-2*) : 42-62. Map. Bibliography). It is concluded that a great Australasian continent existed to the west of the Marshall Line (New Zealand–Kermadec–Tonga–Fiji–New Hebrides–Solomons–Admiralty Islands) and that this continent was dismembered in early Tertiary times. Its structural limit is still indicated by a well-defined seismic zone.

SOIL EROSION IN AUSTRALIA. By M. Terry. *Geographical Journal*, 1945, 105 (*3-4*) : 121-129. 7 photographs.

STRAND-LINE MOVEMENT ON THE COAST OF NEW SOUTH WALES. Altimetric frequency curves and longitudinal river profiles provide evidence of an eustatic strand-line movement of 100 to 150 feet on the coast of New South Wales. The data are discussed (*Proceedings of the Linnean Society of New South Wales*, 1945, 70 (*1-2*) : 41-46. 4 figs. 1 map) by W. H. Maze, who explains the wide distribution of the 100-150-foot level of deposition and erosion, by postulating a period of prolonged stability of sea-level corresponding to a maximum of transgression at about 150 feet. This level for New South Wales may be correlated with the 100-foot beach of Britain and the 30-metre terrace of eastern North America.

THE GEOMORPHOLOGY OF THE CENTRAL EASTERN AREA OF NEW SOUTH WALES. Part I. Methods of Landform Analysis from Topographic Maps. Part II. Landform Analysis of the Orange–Bathurst District. By W. H. Maze. *Journal and Proceedings of the Royal Society of New South Wales for 1944*, 1945, 78 (*1-2*) : 28-41. 3 figs. 2 maps.

HYDROTHERMAL ACTIVITY AT NGAWHA, NORTH AUCKLAND. By C. A. Fleming. With a section on Underground Water, by J. Healy. *New Zealand Journal of Science and Technology*, 1945, B, 26 (*5*) : 255-276. 5 figs.

COFFEE AND SETTLEMENT IN NEW CALEDONIA. In the *Geographical Review* (1945, 35 (*1*) : 12-21. 11 figs.) J. Parsons, after a brief description of New Caledonia and its settlement, gives an interesting account of the coffee industry which engages the majority of the rural white population. *Coffea arabica* and *robusta* thrive on the easily worked alluvial lands near sea-level and hill plantations have also been highly successful. The surplus of the crop has been taken over by the U.S. Army, and the Australian market will offer important possibilities. The coffee-growing areas and automobile roads are shown on a map, scale 1 : 3,500,000.

GENERAL

THE DISTRIBUTION OF TYPES OF SKIN COLOUR. Variations in intensity of brown colouring in relation to ultraviolet radiation and high temperatures are discussed by Professor H. J. Fleure in *The Geographical Review* (1945, 35 (*4*) : 580-595. 4 figs.), with special reference to complex problems of human migration and to archaeological evidence. Problems of skin colour in East Asia and in pre-Columbian America are reviewed. One of the maps illustrating the article tends to show that brown skin pigment occurs widely along with other, diverse characters, so that it is an early feature, intensified in Africa and reduced in Europe.

AIR PHOTOGRAPHY IN PEACE. The particular qualities of air photographs in contrast to maps are being more widely appreciated. The use of air photography not only in military reconnaissance but for peace-time survey has proved its value. Prehistoric earthworks, for instance, have been traced in greater detail than is possible in a ground survey, and agricultural systems of former communities have been revealed by air photography. Drawing on many records, Dr. J. K. St. Joseph (*Geographical Journal*, 1945, 105 (*1-2*) : 47-59. 17 photographs) discusses the subject of air photography and archaeology and many of its bearings on further research. In an article in *Chambers's Journal* (October 1943), Dr. Arthur Geddes pointed out how flight illumines a geographer's quest, and how the layman—pilot or passenger—may share in this. The time seems ripe for learning from the archaeologists, and enlisting the co-operation of airmen in geographical research. The establishment of an aerial unit for scientific work has been advocated recently [see *S.G.M.*, 61 (*2*) : 53] by the British Ecological Society.

REVIEWS OF BOOKS

EUROPE

Islands Round Britain. By R. M. Lockley. 9×6¼ inches. Pp. 48. 8 plates in colour. 27 illustrations in black and white. London : William Collins, Sons and Co. Ltd., 1945. *Price* 4*s.* 6*d.*

This publication is well up to the high standard set by the *Britain in Pictures* series, and we know that everybody loves an island—here is sufficient testimony to the attractiveness of *Islands Round Britain*. The author has not attempted to describe all our islands but, rather, to proceed round the coasts and to find islands of interest at regular intervals. The result of this method is that practically all the English and Welsh islands appear and about the same number of Scottish and Irish. This procedure has obvious drawbacks, but possesses the advantage of appealing to the local sentiments of us all, regardless of the stretch of coast we know best.

All the illustrations are derived from old drawings and paintings. The selection is excellent.

C. R. V. G.

The Path by the Water. By A. R. B. Haldane. 8×5½ inches. Pp. vii+152. Wood engravings by Helen Monro. Edinburgh and London : Thomas Nelson and Sons Ltd., 1944. *Price* 15*s.*

This book is a charming account of the boyhood of an angler, spent chiefly beside the brown trout-burns and streams of the Ochil Hills, though four of the thirteen chapters are devoted to Glen Etive and to the Itchen during school-days at Winchester. It will delight all fishermen, for whom it is perhaps primarily written, but artists and lovers of plant and animal life cannot fail to enjoy the author's delicate and loving word-pictures of a district which still remains little publicised. Miss Helen Monro's exquisite woodcuts of flower and field add greatly to the charm of this delightful description of Scottish wild life and scenery.

I. W. H.

Presenting Scotland : A Film Survey. By Norman Wilson. Crown 8vo. Pp. 36. 19 illustrations. Edinburgh : Edinburgh Film Guild, 1945. *Price* 2*s.*

This illustrated booklet provides an interesting summary of Scottish film production and a most useful annotated list of films of Scotland.

J. H. K.

Cycling in the Lake District. By JOHN CROWE. Crown 8vo. Pp. 85. 17 illustrations. Sketch-map. London : Skeffington and Son Ltd., 1945. *Price 7s. 6d.*

This is an unpretentious and pleasant little book. Without claiming to be a guide, it does nevertheless in the course of a dozen tours, recounted in as many interesting chapters, cover the Lake District to its remotest corners. The author is no mere fair-weather cyclist : he knows and loves the land under all conditions. The last two chapters contain notes on touring in general and on touring in Lakeland in particular, and include a list of recommended addresses. Only the sketch-map is disappointing : it is not always easy to follow exactly the routes so well described in the text. There is a useful index of proper names. R. T. C.

The History of Worcestershire Agriculture, and Rural Evolution. By R. C. GAUT, M.Sc., N.D.A., N.D.D. 8½×5½ inches. Pp. xvi+490. Worcester : Littlebury and Co. Ltd., 1939. *Price 15s.*

Many writers illustrating an aspect of county or parish life realise the necessity of an opening chapter on the "setting," yet fail to recognise that the whole fabric of their exposition should hang on this geographical framework. This book in particular lacks just that geographical approach which makes the review of past agriculture and the people who practised it live for us in the present.

Mr. Gaut begins each period or century with a rapid review of conditions in England as a whole, then proceeds to illustrate the age with examples drawn from Worcestershire. He treats land tenure, agricultural and horticultural methods, crops, social conditions, communications, markets and farms, for each period, with such a wealth of detail that the book makes difficult reading to one unfamiliar with the Worcestershire scene. Perhaps the reading would be less pedestrian if the evolution of these several aspects had been treated in chapters to themselves. Nevertheless, the wealth of statistical and other information (for instance, relating to the fruit-growing Vale of Evesham) is of interest to the geographer. S. A.

La Hollande : Un pays à la mesure de l'homme. By S. DE GORTER. Crown 8vo. Pp. 80. 15 illustrations. London : Hachette, 1945. *Price 2s. 6d.*

The character of the Netherlands and the Netherlanders, manifested in land reclamation, farming and horticulture, fisheries, town planning and architecture, public health, commerce and colonisation, arts and science, is admirably surveyed in this little book. The final chapters show how indestructible are the heroic qualities of the nation and how apt is the motto of the House of Orange : *Je Maintiendrai.* In an appendix, a brief account is given of the little-known action of French troops in Holland in May 1940. The satisfying type and illustrations are in keeping with the clarity of the author's style. J. H. K.

The Swiss Contribution to Western Civilisation. By RAPHAEL E. G. ARMATTOE. With a Foreword by Professor Julian S. Huxley, F.R.S. Crown 8vo. Pp. 91. Dundalk : W. Tempest, Dundalgan Press, 1944. *Price 5s.*

The cultural achievements of small democracies are by no means negligible, but are not always adequately understood in other countries. Switzerland, in particular, is a centre of cultural activities which has made a contribution to western civilisation out of all proportion to the size of the country. Dr. Armattoe has assessed this contribution by summarising Swiss achievements and providing a survey, even if incomplete, of Swiss who have distinguished themselves in their own country and abroad. There are also listed scholars, artists and others from abroad who found asylum, or who held responsible posts, in Switzerland. J. H. K.

British Survey Handbooks. 5. Denmark. Edited by JOHN EPPSTEIN. Fcap. 8vo. Pp. 88. Map. Cambridge : University Press, 1945. *Price 3s.*

Life and conditions in an independent country which is little more than half the size of Scotland are, or should be, of vital interest. In the words of Commander S. King-Hall, Denmark "means a nation more highly educated in the mass than any other national group, it means efficiency without dulness, it means a social state which has achieved true democratic standards." The fifth *Handbook* [cf. *S.G.M.*, 60 (*3*) : 87 ; 61 (*1*) : 29] gives essential information about the history, environment, life and work, and the economy of Denmark, and Mr. Sten Gudme contributes two chapters on the German occupation. An appendix contains notes on the central and local government and on social insurance. J. H. K.

The Baltic Nations : Estonia, Latvia and Lithuania. By F. W. PICK, D.Phil. Crown 8vo. Pp. 172. 2 sketch-maps. Bibliography. London : Boreas Publishing Co. Ltd., 1945. *Price 7s. 6d.*

This book appears with the blessing of the Latvian Minister in London and certainly deserves such a recommendation. Although it is not a big book, it covers competently the history, the very complicated history, of this recently much talked of but really little known region of Europe from its origins ; it describes its relations with Germans, Danes, Swedes, Poles and Russians, and leaves the reader amazed that any sense of nationality at all should have survived such prolonged oppression ; one is filled with admiration for the dauntless spirit of the brave peoples concerned and wonders what their future is likely to be. "It is in the pursuit of a real peace that lessons are drawn from the history of the three Baltic peoples." For, in spite of having, through the ages, largely shared a common fate, they *are* three, and one regrets the necessity, because of the limitations of space, of discussing the history and institutions of all three within the same chapters ; it does not make the reading of an interesting but difficult subject any easier. R. T. C.

The Italo-Yugoslav Boundary : A Study in Political Geography. By A. E. Moodie, B.A., Ph.D. With a Foreword by Professor E. G. R. Taylor. Demy 8vo. Pp. viii+241. 22 figs. Bibliography. London : George Philip and Son Ltd., 1945. *Price* 8*s.* 6*d.*

We read recently that the Foreign Ministers after their conference had referred certain difficult questions to their deputies. If the frontier here discussed be one of these questions, the deputies are forunate in having at their disposal so valuable a summary of the problem, discussed so clearly and without heat. It follows that Dr. Moodie's book should be read by all who would understand the difficulty of solving this problem which is due to the clash of national interests, real or imaginary, in the Julian Region. It is an able and scholarly work written for serious students of such subjects, but it may be commended to others who may not wish to follow the author in the fullest detail.

The physical geography of the whole frontier zone, and especially of the Julian Karst, is well and accurately described. Next come the salient facts of the regional history down to the eighteenth century ; a useful chapter is included on the Slovenes, the mountain Slavs whose subjugation, in turn to Avar, Frankish and Austro-German rule, lasted for thirteen centuries. With Napoleon's creation of the Illyrian Provinces the author embarks upon an account of the political and diplomatic history, becoming progressively more detailed, but always in special relation to the geographical, ethnic and economic factors. He devotes twenty-six pages to the growth of the Julian ports, Trieste and Fiume, and to the development and use of railways leading to them. Thus the contrast is emphasised between the low intrinsic status of the region and its great importance as a transit area between the Mediterranean and east-central Europe.

The successive efforts at boundary-making in this region of political strain are described carefully and the motives analysed. This section is particularly well documented, and the author's local knowledge makes his discussion of the treaties specially reliable. He shows conclusively the folly of using a watershed in the delimitation of a boundary through the Karst, a district with its drainage largely underground, as in the Treaty of London (1915). By his examination of the Treaty of Rapallo (1920) which determined most of the boundary that existed between the World Wars, he assesses the degree in which the delimitation favoured Italy strategically. Dr. Moodie, however, does not mention the Boundary Commission which demarcated the line. Their Report, which presumably remains unpublished by the League of Nations, would be expected to justify their interpretation of the Treaty and would make interesting reading. It might prove to be a useful warning in view of the re-settlement of this and other frontiers.

The book has a bibliography of 120 items and is illustrated by well-drawn maps : all are interesting, but one might well have been added to show more of the place-names mentioned in the opening chapters. The author must be congratulated on his success in maintaining a judicial attitude and also upon his skill in marshalling the facts. In concluding his text before the war was over, he ends on a pessimistic note. History has hitherto shown no way of eliminating national strife in the Julian Region ; and, so long as frontiers continue to have their present significance in Europe, he sees little hope that a way will be found. But he will have convinced most of his readers that a decision less partial to Italy is overdue.

A. G. O.

Trieste. By A. J. P. Taylor. 8½×5¼ in. Pp. 32. Sketch-map. London : Yugoslav Information Office, 1945. *Price* 1*s.*

In this pamphlet an Englishman has presented the Yugoslav case for possession of Trieste, and he has done it well and logically. Moreover, he rejects as unworkable and dangerous the suggestion that it be made a "Free City." Two points from the argument may be quoted : "The possession of the city condemned Italy to an imperialist policy in Central Europe." "If the Italians live up to all their fine promises and the Yugoslavs to none of theirs—then and then only, Trieste should indeed be Italian—but Malta, Tobruk and Addis Ababa should be Italian as well!" On the economic aspect the author holds that a pacific Italy will inevitably neglect Trieste, while the Yugoslavs, in their own interest, will make it the major port of Austria, Hungary and Czecho-Slovakia.

A. G. O.

Peoples of the U.S.S.R. By Anna Louise Strong. 9½×6½ in. Pp. ix+246. 97 photographs. End-paper maps. New York : The Macmillan Company, 1944. *Price* $2.50.

The author of this book is the American widow of a Russian and has had more than twenty years of first-hand experience of the U.S.S.R. She has visited fifteen out of the sixteen republics that form the Union ; she has devoted herself to the study of the numerous and varied peoples that constitute it and to the promotion of better understanding between them and the Americans. And it is a wonderful and interesting story she has to tell.

The Russians have achieved in the last twenty-five years not only tremendous and widespread reorganisation in their own homeland and throughout the old Empire, but miracles of reconciliation, for, while transforming the material circumstances of many one-time subject peoples, they have brought about a striking change in their national spirit and in their attitude towards the Russians. These peoples never had any reason to love the Tsarist government, very much the reverse, and it is improbable that all the inhabitants of all the constituent republics—e.g. the Baltic states—are quite so enthusiastic over the present Russian connection as the author represents ; but, in the war that has just come to an end, they fought in battle and on the industrial front willingly and with distinction alongside the Russians. That is a very important fact.

The book deserves to be widely known. It is easily read and will enable many who have no time to study longer or more elaborate works to realise in some measure what a serious factor

in world history and economics the Soviet Republics are destined to become. There are numerous interesting photographs. The end-paper map is hardly adequate. R. T. C.

New English-Russian and Russian-English Dictionary (*New Orthography*). By M. A. O'Brien, M.A., Ph.D. $6\frac{1}{4} \times 4\frac{3}{4}$ in. I. English-Russian. Pp. xii+363. II. Russian-English. Pp. xx+344. London: George Allen and Unwin Ltd., Fourth Impression, 1944. *Price* 10*s.* each volume.

This is a good dictionary. It has many excellent qualities; one of them is the author's frank acknowledgment of indebtedness to distinguished predecessors, German and Russian. The author claims to have included "*all* recent words which have gained currency in commerce, science, and sport." Even a very large dictionary would have difficulty in justifying such a claim. A very brief examination fails to find such common terms as *broadcast*, *loudspeaker*, *ski*, *aircraft carrier*, and typical coined words like *Ogpu*, *Kolkhoz*, *Sovkhoz*. We miss a list in both languages, but especially in Russian, of those numerous abbreviations, e.g. A.R.P., N.E.P., S.S.S.R., which are such a nuisance to foreign readers. The introductory matter on pronunciation, declension and conjugation is useful and compact; Russian accentuation and verbs are treated more satisfactorily than in any comparable work (in English) known to us. R. T. C.

ASIA

Himalayan Holiday: A Trans-Himalayan Diary, 1939. By Peter Young. With a Foreword by Wing-Commander Bentley Beauman. Demy 8vo. Pp. 108. 19 illustrations. 3 maps. London: Herbert Jenkins Ltd., n.d. [1945]. *Price* 10*s.* 6*d.*

This simple, modest account of a trip to explore an uncharted stretch of the river Shaksgam in the Karakoram, north-east of Srinagar and Leh, sets out descriptions of the country, the trials and entertainments of the road, the party and other wayfarers, and efforts at *shikar*. It tries to give serving officers with accumulated leave, and wishing to spend an original holiday, some perspective of the way to do so; and it is illustrated with a broad range of photographs, good in spite of war economy standards. Squadron-Leader Young writes with a modesty refuted by his attainments on this trip from May 9 to July 28, 1939. This is much more than a trip: it ranks as a minor expedition and has interest for the anthropologist as well as the geographer. Further diaries will be welcome. R. E. C.

Britain and Malaya. By Sir Richard Winstedt, K.B.E., C.M.G., D.Litt. (Oxon). Crown 8vo. Pp. 80. 20 photographs. 2 maps. London: Longmans, Green and Co. Ltd, 1944. *Price* 1*s.*

It is no easy task in the space of eighty pages to give a comprehensive survey of the relationship between Britain and Malaya. The author of this pamphlet—a leading authority on matters Malayan—has to be congratulated on an outstanding accomplishment. His wide knowledge of Malayan history and his intimate acquaintance with the country are both reflected in this excellent book, a feature of which is the very beautiful illustrations. J. A.

Siam. By Sir Josiah Crosby, K.C.M.G., K.B.E., C.I.E. Demy 8vo. Pp. vii+174. 9 photographs. Map. London: Hollis and Carter Ltd., 1945. *Price* 12*s.* 6*d.*

This charming book is the work of a writer who has had long and intimate association with South-East Asia but particularly with Siam. Here the reader will find a lucid description of the geography and history of the country, written by one who is deeply sympathetic to its people. He describes in detail life under the monarchy and, later, under the dictatorship. He explains the difficulty of Siam's geographical position and the reasons for the deterioration of the relationship with Britain, leading to the Japanese occupation.

The book leaves us with the impression that the happy relationship with Siam might easily be restored. J. A.

Japan: A Geographical View. By Guy-Harold Smith and Dorothy Good, with the collaboration of Shannon McCune. Royal 8vo. Pp. 104. 3 figs. 2 maps. 35 tables. American Geographical Society Special Publication No. 28. New York: American Geographical Society, 1943. *Price* $1.50.

In his brief Introduction, the Director of the American Geographical Society states that this is essentially a book of facts compiled from source materials readily available and mainly in English. But the compilation was carried out by expert geographers and the result is a clear-cut picture of the geography of Japan at the outbreak of war. The first short section on the position of Japan with its reference to the nearest Allied bases and the need for cutting Japanese supply lines to Malaya reads interestingly in retrospect and so does some of the final section on Territorial Expansion. But the remainder is of permanent value. Statistics refer mainly to 1930 (population), 1936 (industrial output), or 1939 (trade)—in each case the latest pre-war figures, so that they will serve as a standard of comparison for the future. On one of the maps of the folding plate Guy-Harold Smith has attempted the important and difficult task, with considerable success (though failing to emphasise some outstanding features), of constructing a physiographic diagram-map (scale 1 : 4,000,000). Mr. George Kiss contributes the other large map—the rate of growth of population 1920-1935—which brings out the pressure of population around the Inland Sea, so that the main areas of increase are not in this already over-populated area but in the north.

L. D. S.

Japan : A Physical, Cultural and Regional Geography. By GLENN THOMAS TREWARTHA. Crown 4to. Pp. xv+607. 281 figs. Madison : The University of Wisconsin Press, 1945. *Price* $5.00.

A full-scale geography of Japan has long been an outstanding need. It was partly supplied by Trewartha's *Reconnaissance Geography of Japan* written in 1932-33 and describing Japan as it was about 1930. But, as the author himself suggests, Japan was then scarcely launched on the expansionist developments which led up to the war. Whilst the present book draws material, especially on the physical background, from its predecessor, the greater part is completely new. Magnificently illustrated by an unrivalled series of photographs, a profusion of maps and diagrams (including Guy-Harold Smith's Physiographic Map as a folding plate), and consisting of a readable text, fully annotated and balanced by statistical tables with figures up to 1940, the whole book is a model of its kind. The University of Wisconsin, of the Geography Department of which Professor Trewartha is head, has played its part by making the whole available at the modest price of five dollars.

The work is in three parts. The first deals with the physical background including minerals ; the second with the cultural and economic geography of the whole ; the third is devoted to a detailed description of each of the chief regions. Hokkaido is included but not the Empire. Throughout there is evidence of the author's extensive personal journeyings in the country. In places one might wish that the author had relied even more on judgment based on this personal knowledge. Despite the numerous occasions on which it has been shown that the artificial mathematical classification of climate devised by Köppen is inapplicable to Asia, Trewartha once again attempts to modify it so as to make it fit Japanese conditions. If it is regarded as fundamentally important to relate the climatic regions of Japan to world conditions, the scheme worked out by Thornthwaite would seem to be preferable.

For the remainder of the book there can be nothing but praise. It is very interesting to notice that very considerable use has been made of publications in Japanese and the very full series of detailed maps illustrating the types of settlement and town locations is particularly instructive. The third part of the book follows the regional division drawn up previously by the author, and which is now substantiated by numerous maps, photographs and statistics. The wide range of evidence used is particularly fascinating. An interesting example is afforded by the diagrams of house construction in response to local climatic conditions. As a result the book also serves as an invaluable source of material in the elaboration of geographical principles. L. D. S.

AMERICA

Geography of Latin America. By FRED A. CARLSON. Med. 8vo. Pp. xxiii+566. 175 figs. including maps and diagrams. New York : Prentice-Hall, Inc. Revised Edition, 1944. *Price* $6.00.

This is a useful work meriting the revised edition and certainly fulfilling the main purpose of the author as stated in the first edition (1936) : " to endeavour to establish a better understanding and appreciation of the countries of Latin America." While it is not an encyclopedic book, it does contain a great amount of really useful information, including statistical matter to 1940 or later. But besides this, it justifies the aim, notably by the attention given to assessment of social, cultural and economic conditions prevailing in each of the separate countries. The reader is duly prepared for this by an interesting first chapter, entitled Cultural Heritage, which is followed by others on the physical, economic and historical aspects of the whole area. The author returns to the general theme in the last three chapters dealing with such matters as inter-American transportation, commercial relations and mutual understanding. Over three-quarters of the book are given to separate accounts of each state. These are all interesting, although some are rather brief, and the geographical point of view is well maintained.

The book is profusely illustrated by photographs, maps, etc. ; the former are well chosen and worthy of better paper, and while most of the maps are good, some of those showing regions and districts might easily have been made more illuminating. There are three coloured maps (not four as stated in the contents) which are certainly the least attractive feature of the work. On the other hand, the selected references constitute a useful bibliography. A. G. O.

Jungle in the Clouds. By VICTOR W. VON HAGEN, F.Z.S. Demy 8vo. Pp. 223. Illustrated. End-paper map. London : Robert Hale Ltd., 1945. *Price* 15*s*.

Very little of the world remains undiscovered, and the modern explorer must find some motive for his journey other than the investigation of untrodden paths. The author of this book found such a motive in the quetzal, that gorgeous and half-mythical bird of Central America whose gay plumage formed the head-dress of the ancient Mayan priests, and which is depicted in their stone carvings. No one had ever photographed or captured a quetzal until the author, accompanied by his wife and a friend, undertook, in 1937, this journey to the " Jungle in the Clouds," the rain-forest more than 6000 feet up in the highlands of Honduras.

The hardships of the untracked way, the battle with climate and insects, the discovery of the nesting quetzals, and the transport of fledglings (nine of which reached New York alive), all form a fascinating tale which is unfolded with skill and humour. Having disposed of the quetzals, the explorers turned their attention to mankind and studied the ethnology of the Jicaques Indians, a primitive race who wear bark clothing, hunt with the blowgun, and use flint and steel to make fire. Finally the expedition investigated the ruin of the Mayan city of Copán, on the Guatemalan frontier, and the author gives an excellent account of the remarkable architecture and carvings there.

The book contains an abundance of interesting photographs of birds, natives and scenery, and an end-map clearly indicates the route. It is a noteworthy contribution to the geography of a little-known region. D. G.

TVA : Democracy on the March. By DAVID E. LILIENTHAL. 7×4½ in. Pp. 208. 15 illustrations. Sketch-map. Harmondsworth : Penguin Books Ltd., 1944. *Price 9d.*

David Lilienthal, the Director of the Tennessee Valley Authority, speaks of the undertaking as Democracy on the March, and any who find the general world outlook depressing will be encouraged and stimulated by this account of the regional development of this river basin. Great as the technical achievements have been in harnessing the water power, improving navigation, controlling floods and preventing soil erosion, T.V.A.'s outstanding achievement is its contribution to the social and economic well-being of the people living in the region. A true integration of human activity has been attained. Industry, agriculture and forestry have been geared together, and with this interlocking there has been not only a rapid rise in the standard of living but an improvement in health, education, amenities, and social welfare generally. T.V.A. has blazed a trail which could be followed with advantage in many river basins of Europe and Asia, and the spirit of co-operation which has developed in the seven States of the Tennessee Valley would ease the tensions in some of the danger spots of the world. S. C. F.

OCEANIA

Britain and the South Seas. By Sir HARRY LUKE, K.C.M.G., D.Litt. Crown 8vo. Pp. 71. 19 illustrations. End-paper map. Longmans' Pamphlets on the British Commonwealth, Second Series, No. 2. London : Longmans, Green and Co. Ltd., 1945. *Price 1s.*

A former High Commissioner for the Western Pacific has produced an excellent historical survey of the British colonies, mandated islands, etc. in that area, including those under Australian and New Zealand administration. He has added Hawaii and Tahiti, which were offered us by their native rulers but declined.

A point which Sir Harry Luke very properly stresses is that Tonga occupies a unique position in the British Commonwealth, being " not a British Protectorate . . . (but) an independent kingdom under British protection, a very different thing." His allusion elsewhere to the Caucasian derivation of the Polynesians without mention of their (possibly dominant) Malay strain and his linking of the problematical Melanesians with Africa are less happy. C. R. V. G.

Pacific Partner. By GEORGE H. JOHNSTON. Crown 8vo. Pp. 182. End-paper map. London : Victor Gollancz Ltd., 1945. *Price 7s. 6d.*

Pacific Partner is an Australian war correspondent's picture of the Commonwealth at war. It has been written for Americans, but for the greater part it is a straightforward account of Australia's war efforts in the field and at home, written without ulterior motive.

The writer justly calls attention to the fact that Papua was the only colonial territory—this definition excludes the Philippines—where the native population rallied to the support of the whites. We hope, however, that the American reader will realise that Papua was " virgin " soil when Australia assumed responsibility half a century ago, and consequently, that the administration has inherited no aftermath from older regimes. The fact nevertheless remains that the Mother Country has much to learn from Australia—and New Zealand—about the running of " colonial " territories.

Mr. Johnston's faith in the United States yet permits him to express the belief that Australia is the purer of the two democracies. He realises the Commonwealth's need of immigrants and hopes that the United States will furnish a large quota. C. R. V. G.

A South Sea Diary. By S. W. POWELL. 7×4½ in. Pp. 143. Harmondsworth : Penguin Books Ltd., 1945. (First published 1942.) *Price 9d.*

The reader of *A South Sea Diary* should note that it refers to the years 1912-1913. Since then, radio has destroyed the isolation of practically every island by at least bringing it into aural contact with the rest of the world. Mr. Powell's diary describes the life of an Englishman with his Tahitian wife in Tahiti and the Paumotus. Its charm lies in the author's easy style together with his willingness and ability to understand the Tahitians, among whom he worked and made his home. The description of life in the dreary Paumotus is especially valuable, since little has been written about these dangerous atolls. C. R. V. G.

Vouza and the Solomon Islands. By HECTOR MACQUARRIE. Crown 8vo. Pp. 142. 18 photographs. 2 sketch-maps. London : Victor Gollancz Ltd., 1945. *Price 9s.*

Vouza is a Lance-Corporal in the Solomon Islands Police and the mainstay of a District Officer in the isolated Santa Cruz Group. He has been made the centre-piece of the District Officer's story of his tenure of office among a friendly tropical people who are as little affected by contact with the white man as any to be found to-day. C. R. V. G.

PLANT GEOGRAPHY

Foundations of Plant Geography. By STANLEY A. CAIN. Med. 8vo. Pp. xiv+556. 63 figs. 720 bibliographical references. New York and London : Harper and Brothers, 1944. *Price* $5.00.

" Foundations " is perhaps not an entirely happy choice for the title. Foundations are things on which one builds. This book is largely superstructure of a somewhat rambling type. The author cites a vast amount of literature, but there is a good deal to criticise in the selection, interpretation and synthesis of the data collected.

If the reader is at all sensitive to terminology and style, he is likely to be irritated by the tendency to jargon and to involved and obscure writing, often covering fairly obvious facts or inferences. Throughout the book " principles " are enunciated, but these are of varying degrees of authority and it is doubtful if some of them can be called principles at all, if one understands that term in its normal meaning of highly general laws.

The book is divided into five sections : Introduction, Paleoecology, Areography, Evolution and Plant Geography, and Significance of Polyploidy in Plant Geography. It will be seen that a large part of the book deals directly or indirectly with evolutionary problems. It is instructive to compare the treatment given, not only to these problems but also to special cases (e.g. Turrill's observations on the distribution of *Ajuga chia* and *Ajuga chamaepitys*) in this book and in Julian Huxley's *Evolution : The Modern Synthesis*.

What, after all, does or should Plant Geography try to do ? The lines of Robert Louis Stevenson might supply the answer :—

" O, I wad like to ken—to the beggar wife says I—
Hoo a' things come to be whaur we find them when we try."

Given a leading idea such as this, the intelligent student should be able to make his own synthesis of the mass of valuable facts culled from the many papers and books mentioned in the voluminous bibliography. W. B.

Plants and Plant Science in Latin America. Edited by FRANS VERDOORN in co-operation with eighty-five authors. 10½×7 in. Pp. xxxviii+383. 38 plates. 45 figs. End-paper maps. A New Series of Plant Science Books, Vol. 16. Waltham, Mass. : The Chronica Botanica Company ; London : Wm. Dawson and Sons Ltd., 1945. *Price* $6.00.

The regions of Latin America are many and different. Almost each one gives us something of personal value, be it bananas or vanilla, chillis or tomatoes, cocoa or hats, mahogany, limes, rubber, peanuts or fuchsias, maize or cocaine, strawberries or quinine, cloves or orchids, cactus or dahlias, derris or potatoes. This book presents the material for the backgrounds of the various regions. Although it offers to present and future students of pure and applied plant sciences in Latin America summaries of, and references to, practically all the available material upon these subjects, it is of interest to a much broader circle.

Six pages of the introductory bibliographic notes list over ninety travel books by English, Spanish, French, Danish, German and Latin American writers, dating from 1699 to 1942. Another seven and a half pages of the Introductory Essay give supplementary notes to the bibliographies at the end of each article upon each vegetative aspect of each region. All the relevant publications by the Office of Foreign Agricultural Relations of the U.S. Department of Agriculture are given also in those notes. So much for the introduction.

The text consists of two parts, the first of 258 pages of original articles upon the various regions, treating geological, productive and floral aspects from the botanical, ethnographical and commercial sides. There is a special supplement on plant breeding, genetics and cytology. The second part consists of revised articles mostly published in *Chronica Botanica*. All articles have bibliographies and are authoritative. The table of contents contains cross-references in both parts.

The editor's remarks are indicative : " The biologists of the United Nations are, or will soon find themselves, in a unique position . . . in the conduct of international relations work, with its profound implications. A group of them can be instrumental in assisting in making the Western Hemisphere strong and influential, one of the least Utopian guarantees of a durable peace." His endeavour to assist by this work, encyclopedic though its form may be, will be appreciated by the range of people who, reading it, find doors opening to a range of most fascinating prospects. The plates and other illustrations supplement the text in a manner unusual to us " easterners," as Latin America might call us, but are worthy and as cosmopolitan as the text. R. E. C.

CARTOGRAPHY

Down to Earth : Mapping for Everybody. By DAVID GREENHOOD. 4to. Pp. 262. Illustrations by Ralph Graeter. New York : Holiday House, 1944. *Price* $4.00.

In English usage, whatever it may mean in America, " down to earth " usually connotes a return to the humdrum or even to the stark realities. No book on the subject of maps and map-making was ever less humdrum, nor were the " realities " of globes and projections, triangulation and co-ordinates, distance and relief ever presented in a more readable form. From the puff on the wrapper to the last page of the text the book goes with what we regard as typical American slickness, and the reader who approaches the work cautiously is immediately swept into the stream of the author's zest and enthusiasm for his subject. Mr. Greenwood " wisecracks " his way through

the book, and the layman, for whom it is primarily intended, having chuckled *his* way from page to page, finds at the end that he has acquired, in spite of himself, a much wider knowledge of maps than he had when he started. If, to begin with, you did not know "the difference between azimuth and asthma, hachures and hatchets, a rhumb and a rumba" you are left in no doubt by the time you have finished reading. And all this adds up to the fact that here is something new on a subject the intricacies of which have been the province of the few.

Yet the book is by no means faultless. It is intended principally for American readers, and most of the examples and allusions are naturally taken from the U.S.A. and, to a lesser extent, from Canada. In this respect it falls down as compared with the more restrained treatment followed by most authors on this subject. In his efforts to make the layman understand many of the points which he makes, the author has frequently to reiterate, and were it not for the fact that these reiterations are made in some witty form, they might become tedious. In this way does he gild the pill, but under the gilt is a fairly exhaustive and informative treatment of a subject which in these days is gaining for itself a far wider study than before. And so, no one interested in maps should miss reading *Down to Earth*. A. T. G.

EDUCATIONAL

A Background of Physical Geography. By GEORGE P. KELLAWAY, B.Sc., F.R.G.S. Demy 8vo. Pp. viii+232. Diagrams and Charts. London: Macmillan and Co. Ltd., 1945. *Price* 8*s*. 6*d*.

Among geographers opinions vary on the emphasis to be laid on the various aspects of physical geography. In this book there is little at which to cavil except for a few details. The usual sequence for a book on this subject is followed.

In the first section, the facts of mathematical geography are, with one exception, made adequately clear. The explanation of the international date line has been over-elaborated and thus made unnecessarily confusing. In the section on relief features and erosion, mention should be made of the description of mountain building, which is very well treated as is also that on the atmosphere. Readers of this book will find the explanation of temperate cyclones particularly clear. Seldom is this subject treated so concisely or is so well expressed. The section on natural regions and their types of climate is merely adequate for the purpose for which the book is written. One feels that more should have been said, for example, of the monsoon regions outside India, of the winter rain of the Yangtze Kiang valley, of the maritime conditions of western North America, and of the climatic conditions of New Zealand.

One criticism of the book as a whole might be permitted, and that is the lack of photographic illustrations. Printing costs may account for this lack. On the other hand, the questions appended are well chosen and should serve well for revision.

In his preface the author sets himself to "provide a comprehensive foundation in Physical Geography for students in the advanced courses of schools and colleges," and he certainly achieves this aim. So far as Scottish schools are concerned, the book should find a place in the senior school library, and should be more than adequate, in this branch of geography, for pupils preparing for university bursary competitions. A. T. G.

A Contour Dictionary. By J. B. GOODSON, M.A., F.R.G.S., and J. A. MORRIS, B.Sc. (Econ.). Crown 4to. Pp. 47. 60 figs. 8 maps. London: George G. Harrap and Co. Ltd., 1945. *Price* 3*s*. 6*d*.

In Paper I of the Senior Leaving Certificate in Geography is a section of some O.S. map on which the first question is set. No matter how early in the secondary course geography teachers start map reading, there are few who can feel satisfied their pupils will be able to tackle competently any O.S. map question likely to be set. The fault lies not in any lack of enthusiasm on the part of the teacher but in the comparatively short time which can be allotted to this branch of geography and in the number of different O.S. maps likely to be available in school for study. In this contour dictionary the geography teacher will find as many actual examples of land forms, settlements, etc., with deductions therefrom, as would satisfy the demands of any examiner of Leaving Certificate candidates. With one or two exceptions, like drawing careful sections, the questions based on the maps and the aids in writing descriptions of actual areas are very good. The generally low standard of attainment in the interpretation of O.S. maps, which examiners usually find, would, it is confidently felt, be considerably raised by the use of some such book as this. A. T. G.

GENERAL

The Statesman's Year-Book: Statistical and Historical Annual of the States of the World for the Year 1945. Edited by M. EPPSTEIN, M.A., Ph.D. Eighty-Second Annual Publication. Revised after Official Returns. 7×5 in. Pp. xxxvi+1479. 2 maps. London: Macmillan and Co. Ltd., 1945. *Price* 30*s*.

The quality and utility of *The Statesman's Year-Book* are so widely appreciated that extensive comment is quite superfluous. What is remarkable is the hardiness of this annual or, rather, perennial during the inclement years of war. The present volume has been brought up to date as far as circumstances have allowed, and the latest available information is given in introductory tables and additions. One of the more noteworthy additions is a map of world airways (Scale 1 : 100,000,000), designed by John Bartholomew, on a kite projection to illustrate relative positions

in the North Temperate Zone with maximum accuracy and reference to the rest of the world. There is also a map showing the new Russo-Finnish boundary.

The editor and publishers must once again be congratulated and thanked. J. H. K.

Great Britain and the Empire: A Discursive History. By James A. Williamson. Demy 8vo. Pp. vii+213. 11 maps and diagrams. London: Adam and Charles Black Ltd., 1944. *Price* 8*s.* 6*d.*

In this book there is obviously no room for detailed narrative, but there is nothing superficial or flimsy in its structure. From the earliest ages to our own we trace the developments of a state which has, with many limitations, achieved a considerable respect for ordered liberty, has devised not the perfect mechanism but the best so far for keeping government in touch with public opinion, and, in spite of the deplorable deterioration in political manners and other set-backs in the twentieth century, has attained a high degree of freedom from intolerance and corruption. In the co-operate-as-you-please constitution of the Commonwealth of Nations at which we have arrived, the most puzzling and misleading feature for strangers is that the positive, the important part of it is unwritten; and yet it has twice proved its strength.

The author regrets the decline of liberalism in the last fifty years, and notes frequently that the line between radicalism and toryism can be very easily crossed in either direction. He admits that the most depressing fact in our history between the wars was the poor quality of the leadership.

A very readable book. R. T. C.

Land Tenure in the Colonies. By V. Liversage, B.Sc., M.S., N.D.A. Crown 8vo. Pp. ix+151. Cambridge: University Press, 1945. *Price* 7*s.* 6*d.*

The pattern of colonial peasant society must ultimately depend on the type of land tenure which will emerge from the fast disintegrating tribal systems. This change in the agricultural system, now under way, should be guided by men with a wide knowledge of comparative studies in land tenure. Few administrators or district officers appreciate the range or variation in tenure systems, past and present, and it is to these men that Mr. Liversage addresses his essay. In the author's words, the purpose of his book is to give "a general conspectus of the form of agricultural land tenure in various parts of the world, to appraise their practical effects, and to give some indication of their bearing in colonial policy."

In promise of this there appears a résumé of different tenure systems under the headings: Customary Tenancies (tribal and feudal) and Contractual Tenancies (labour, share, cash, emphyteusis and owner occupation). The review of these different tenancies includes a discussion of the customs, so crippling to sound husbandry, of the subdivision of holdings at death, accompanied often by the "fragmentation" of each subdivision, so that each heritor may acquire a portion of each category of land. Subdivision and fragmentation are the direct outcome of owner occupation. To such, also, the evil of mortgaged land and farmer indebtedness may be imputed. For these reasons Mr. Liversage gives warning to colonial administrators that a policy of owner occupation, strongly advocated in the 1930's, will lead not to the betterment and security of the peasantry but to bad husbandry, the "squeezing" of land to pay debts, unwise land speculation, and, finally, to alienation of land in favour of "ignorant and rapacious" moneylenders who, when great land owners, will inevitably control their country politically and financially.

The alternative goal to private ownership is usufructuary, i.e., occupation of land by the farmer to his benefit without actual ownership. Government control means secure tenants, planned economy, prevention of subdivisions and fragmentation, and an easy transition from tribal society to that of a modern society. At the same time many tribal customs and traditions will be preserved "which may form the fundamental basis to the essential distinction of the emergent national group."

The author is to be congratulated on compressing so vast a subject into a readable and instructive form. Human geographers will find much to interest them, especially in the discussion of tribal systems. S. A.

Fabian Colonial Essays. By H. N. Brailsford, M. Fortes, J. S. Furnival, C. W. Greenidge, Rita Hinden, J. F. Horrabin, A. Creech Jones, Sir Drummond Shiels, H. Stannard, Ida Ward, Leonard Woolf, Margaret Wrong. With an Introduction by A. Creech Jones, M.P. Edited by Rita Hinden. Crown 8vo. Pp. 261. London: George Allen and Unwin Ltd., 1945. *Price* 8*s.* 6*d.*

This volume contains twelve competently written essays by authors who have made special study of their separate themes, covering every aspect of the colonial problem, including geography, land, political and social conditions, poverty, the colour bar, and literacy. Strictly, there is no unity in the book, but the general tendency is towards the principle that government of the colonies should be in the interest of the natives and should aim at bringing these peoples, as soon as possible, into close connection with government. There is a useful chapter on the work of the Fabian Bureau, on what it tries to do, and what it has done by co-operation with the Colonial Office and by using all other democratic means at its disposal. R. T. C.

Colour, Race and Empire. By A. G. Russell. Crown 8vo. Pp. 278. London: Victor Gollancz Ltd., 1944. *Price* 7*s.* 6*d.*

This book is an extremely well documented account of the matter, discussing all problems of politics and economics connected with the colour bar in practice. Saint Augustine's question is

quoted : " If fair dealing is absent, what are empires but brigandage on a large scale ? " While the history here presented of our relations with colonial races is not all black, there is much in it that provides but painful reading. What is required is a complete re-orientation of our thought. We have to realise that no people has a monopoly of any one vice or virtue and that primitive folk becoming nationally conscious see no difference between freedom for Norway and freedom for Nigeria and Jamaica. The author finds the real primary cause of the trouble in " the social and economic structure," the colour bar being used " as an additional protection by one occupational group against another."

R. T. C.

Modern Exploration. By F. KINGDON WARD. Crown 8vo. Pp. 124. 3 figs. London : Jonathan Cape Ltd., 1945. *Price* 6*s.*

In this fascinating little work, the author traces the progress of geographical exploration and shows how the aims and methods of the explorer have become modified to suit present-day conditions. It is sometimes stated that the world has yielded its last secrets to the geographer, but that is not entirely true. The blank spaces on the map have been filled, and only a few unexplored patches remain. Nevertheless, there are many parts which have been surveyed but not fully explored, and many details are still awaiting confirmation in large-scale maps. There is ample work to be done with modern instruments, although political obstacles are many.

Furthermore, the explorer is no longer restricted to a surface ; he may now work in a three-dimensional field, penetrating upwards into the stratosphere, and downwards into the sea and into the earth's crust. It is true that the air, sea and crust, the atmosphere, hydrosphere and lithosphere, which surround the earth in three wrappings or shells, form a relatively thin coating, like the paint on a large globe. Yet the triple shell is some 65 miles thick, allowing 25 miles for air, 7 miles for deep sea and 33 miles for earth's crust beneath the sea floor. The exploration of the world's coverings, in a vertical direction, offers an extensive new field to the geographer.

There are still many unclimbed mountains of 12,000 to 18,000 feet which offer valuable geographical knowledge. Although the mountaineer naturally chooses the highest peaks, the lesser giants often yield more information. There is a difference between mountaineering and exploration. Another field has been opened by the work of Major Kingston, and this is the exploration of the world of the tree-tops in South America, Central Africa and Malaysia. The bird and animal life in the trees of the equatorial rain forest is a life apart. Many of the species are never seen on the ground, and collections made at different heights supply interesting information. Although the deepest mine only penetrates the earth's crust for a distance of 2 miles, a study of the strata in borings, even of the sea floor, may yet prove valuable. The exploration of caves has become a science in itself, and even as near home as the Mendips or the Peak District a vast unexplored field has been revealed in recent years.

The re-establishment of a flora and fauna destroyed by volcanic action is another attractive study for the naturalist explorer. How, and in what sequence, does the sterile land become populated ? Little is known of the contours of the ocean floor, or of the chemistry and physics of the sea. Oceanography, a science of great practical importance, is still in its infancy. At the other end of the vertical scale, the exploration of the stratosphere has only just begun. Finally, there remains a vast territory for the explorer in archaeology, or, as the author calls it, " exploring in time."

In directing the attention of the young explorer to those new and uncharted realms, Mr. Kingdon Ward has performed a valuable service to geography. This book is to be specially commended to teachers of youth, but every reader will find it suggestive and stimulating. D. G.

Lady Hester Stanhope : A Biography. By JOAN HASLIP. 7×4½ in. Pp. 240. Harmondsworth : Penguin Books Ltd., 1945. First published 1934. *Price* 9*d.*

The extraordinary life story of Lady Hester Stanhope, Chatham's granddaughter, niece of Pitt, leader of Society, and later uncrowned Queen of the Arabs, gives infinite scope for biographers. Miss Haslip presents an absorbing story of the last eccentric of the eighteenth century. S. A.

Profile of Salazar : Material for the History of his Life and Times. By LUIZ TEXEIRA. Crown 8vo. Pp. 81. Lisbon : SPN Books, n.d.

A revealing but disjointed account is given of the life and achievements of the Portuguese dictator, who sincerely believes that " we have arrived at a stage of political and social evolution in which a political party founded upon the individual interests of citizens or electors has no longer the right to exist."

J. H. K.

Escape to Switzerland. By G. R. DE BEER, F.R.S. 7×4½ inches. Pp. 159. Harmondsworth : Penguin Book Ltd., 1945. *Price* 9*d.*

The title is metaphorical. This is not a record of adventures in eluding pursuit but a journey of the mind, told in a dozen chapters or, rather, essays dealing with literature, art, music, history and biography, and reflecting " the interplay of sense-impressions, associations and memories centred on Switzerland."

It is not for the first time that the author has " escaped," from anatomy and embryology, to the Alps. The present volume, like his *Early Travellers in the Alps* and *Alps and Men*, is both interesting and extremely readable.

J. H. K.

BOOKS RECEIVED

Highland Power: A Report on the Utilisation of the Hydro-Electric Power envisaged in the Hydro-Electric Development (Scotland) Act, 1943. Scottish Area Committee of the Association of Scientific Workers. Demy 8vo. Pp. 80. Illustrated. Glasgow: William MacLellan, n.d. *Price* 3*s.* 6d.

Interim Report on Population Trends in Relation to Industrial Development and Housing Needs. By Frank C. Mears, *P.*R.S.A., F.R.S.E., M.T.P.I. Fcap. Pp. 40. 3 plates. Edinburgh: Central and South-East Scotland Regional Planning Advisory Committee, 1945.

The Mineral Resources of the Lothians: An Economic Summary and Guide to Sources of Information. By A. G. MacGregor, M.C., D.Sc. Fcap. Pp. 46 (mimeographed). 2 maps. Wartime Pamphlet No. 45. London: Geological Survey and Museum, 1945. *Price* 2*s.*

Atlantic Bridge. The Official Account of R.A.F. Transport Command's Ocean Ferry, Prepared for the Air Ministry by the Ministry of Information. Demy 8vo. Pp. 75. Illustrated. End-paper map. London: H.M. Stationery Office, 1945. *Price* 9*d.*

A Few Facts about Turkey. By Wyndham Deedes. Crown 8vo. Pp. 48. 6 photographs. 1 diagram. 1 map. London: The Secretary, 14 Fitzhardinge Street, n.d. *Price* 2*s.*

The Tropical Far East. By S. Furnivall. 7×4¾ in. Pp. 32. End-paper map. Oxford Pamphlets on World Affairs, No. 71. London: Oxford University Press, 1945. *Price* 6*d.*

Description de la Côte d'Afrique de Ceuta au Sénégal par Valentim Fernandes (1506-1507). By P. de Cenival and Th. Monod. Royal 8vo. Pp. 215. Map. Publications du Comité d'Études historiques et scientifiques de l'Afrique Occidentale Française, Série A, No. 6. Paris: Librairie Larose, 1938.

Paysans d'Afrique Occidentale. By Henri Labouret. Demy 8vo. Pp. 307. 16 plates. Bibliography. Le paysan et la terre, 1. Paris: Librairie Gallimard, 1941. *Price* 65 *fr.*

A Trade Agency for One World. By Eliot Grinnell Mears. 9×6 in. Pp. 64. 6 figs. New York: Citizens Conference on International Economic Union, 1945. *Price* 50 *cents.*

Statistical Year-Book of the League of Nations, 1943-44. (Seventeenth Issue.) Crown 4to. Pp. 315. 6 sketch-maps. Geneva: Publications Department of the League of Nations, 1945.

Map of Predominant Farming Types in Scotland. Prepared by the Department of Agriculture for Scotland. Great Britain. Sheet I. Scale 1 : 625,000 or about Ten Miles to One Inch. National Grid. 42×33½ in. *Explanatory Bulletin.* By L. Dudley Stamp. 4to. Pp. 20. Map reduced to Forty Miles to One Inch. London: Geographical Publications Ltd., for The Land Utilisation Survey of Great Britain, n.d. *Price* 1*s.*

THE SCOTTISH ANTHROPOLOGICAL AND FOLKLORE SOCIETY

At a meeting of representatives of the Scottish Anthropological and Folklore Society and of the Royal Scottish Geographical Society held on June 26, 1945, it was recommended that associate membership of the Scottish Anthropological and Folklore Society should be open to members of the Royal Scottish Geographical Society, the special subscription being Five Shillings per annum. This recommendation was approved by the Councils of both Societies. By this friendly reciprocal arrangement members of either Society have the advantage of being admitted to the lectures of both Societies and of obtaining books on loan from the amalgamated libraries.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

PROCEEDINGS

Meetings of Council were held on September 15th and November 13th, 1945.

OBITUARY

The Society sustained a grievous loss by the death, on August 2, 1945, of George Erskine Jackson, Esq., O.B.E., M.C., W.S.

Mr. Jackson was a keen member of Council and served on the Finance Committee for a number of terms. He was also an active member of the Place-Names of Scotland Committee.

LECTURE SESSION, 1945-1946

EDINBURGH, *Usher Hall.*

Evening Meetings, at 7.30 p.m.

1945

October 18th.—The Right Hon. Lord Rennell of Rodd, K.B.E., C.B., President of the Royal Geographical Society, on "The Geography of the former Italian East African Empire." Film.

November 15th.—Brigadier Bernard Fergusson, D.S.O., author of *Beyond the Chindwin*, on "Upper Burma; 1943 and 1944." Illustrated.

December 13th.—Seton Gordon, Esq., C.B.E., B.A.(Oxon.), M.Z.S., M.B.O.U., on "The Western Highlands and Islands and their Wild Life." Illustrated.

1946

January 17th.—The Right Hon. Lord WINSTER, Minister for Civil Aviation, on "The Airways of the Post-war World."

February 14th.—BERNARD NEWMAN, Esq., Author, on "The Peasants of Europe." Illustrated.

March 14th.—Professor HERBERT J. FLEURE, D.Sc., M.A., F.R.S., Emeritus Professor of Geography, Manchester University, on "United States—A study of unity in diversity." Illustrated.

Lothian Road Church Hall.

AFTERNOON MEETINGS.—Wednesdays, at 3 p.m.

1945

October 24th.—Mrs. F. FRASER DARLING on "Island Housekeeping." Illustrated.

October 31st.—WILLIAM BURNS, C.I.E., D.Sc., F.R.S.E., Agricultural Commissioner with the Government of India (Retired), on "Rural India." Illustrated.

November 7th.—Rev. HAROLD G. NEWSHAM, M.A., on "Japan." Illustrated in colour.

November 21st.—JOHN B. TAIT, D.Sc., Ph.D., F.R.S.E., on "Exploration of the Sea." Illustrated.

November 28th.—ALAN C. BROWNE, F.R.G.S., A.R.C.A., on "New Zealand: Adventure in North Island." Illustrated in colour.

December 5th.—PETER G. GUNN, President of the Edinburgh Natural History Society, on "The Grampian Hills from End to End." Illustrated.

December 19th.—CHARLES M. YONGE, B.Sc., Ph.D., D.Sc., Regius Professor of Zoology, University of Glasgow, on "Islands of the Torres Strait." Illustrated.

1946

January 9th.—Miss ISOBEL W. HUTCHISON, F.R.S.G.S., on "The Aleutian Islands: Some Recent Pictures." Illustrated.

January 30th.—Rev. HOPE MONCRIEFF, M.A., on "South China, from Canton to the Yangtze Rapids." Illustrated in colour.

February 6th.—HAROLD SKELTON, Member of Council of the Jugoslav Society of Great Britain, on "The Danube from Linz to Budapest." Illustrated.

February 20th.—J. E. NICHOLS, M.Sc., Ph.D., Deputy Director, Imperial Bureau of Animal Breeding and Genetics, on "The Agricultural and Pastoral Industries of Western Australia." Illustrated.

March 6th.—FREDERICK G. PEAKE, C.B.E. (Peake Pasha), on "The Land and People of Transjordan." Illustrated.

SPECIAL LECTURE by Major-General G. CHEETHAM, Director-General of the Ordnance Survey, on "Maps and Map Making with special reference to the new O.S. Series" (Illustrated), on Friday, October 26th, 1945, at 7 p.m.

Synod Hall.

FILM SHOWS FOR YOUNG PEOPLE. At 10.30 a.m.

December 28th, 1945.—The British Commonwealth in Films.

January 5th, 1946.—Interesting Geographical Films.

The Society's Rooms.

GEOGRAPHICAL ASSOCIATION, Edinburgh Branch.—November 14th.—Professor HERBERT G. FLEURE, D.Sc., F.R.S., Emeritus Professor of Geography, Manchester University, on "Caste in India."

GLASGOW, *Lyric Theatre*, at 3 p.m.

1945

October 20th.—The Right Hon. Lord RENNELL OF RODD, K.B.E., C.B., on "The Geography of the former Italian East African Empire." Film.

November 15th.—Brigadier BERNARD FERGUSSON, D.S.O., on "Upper Burma; 1943 and 1944." Illustrated.

December 15th.—SETON GORDON, Esq., C.B.E., B.A.(Oxon.), M.Z.S., M.B.O.U., on "The Western Highlands and Islands and their Wild Life." Illustrated.

1946

January 19th.—Group-Captain DAVID F. MCINTYRE on "Scotland's Place in World Air Transport." Illustrated.

February 16th.—Rev. H. G. NEWSHAM, M.A., on "Japan." Illustrated in colour.

March 16th.—J. M. WORDIE, Esq., M.A., F.R.S.E., on "The Canadian Arctic and North-West Greenland." Coloured Film and Lantern Slides.

ABERDEEN, *Natural Philosophy Class Room*, at 7.30 p.m.

1945

October 16th.—SETON GORDON, Esq., C.B.E., B.A.(Oxon.), M.Z.S., M.B.O.U., on "The Western Highlands and Islands and their Wild Life." Illustrated.

October 23rd.—Major-General G. CHEETHAM, Director-General of the Ordnance Survey, on "Maps and Map Making with special reference to the new O.S. Series." Illustrated.

November 13th.—ANDREW C. O'DELL, Esq., M.Sc., on "Life in the Shetland Isles." Illustrated.

December 11th.—ROBERT M. ADAM, Esq., on "National Parks: A Naturalist's Choice for Scotland." Illustrated.

1946

January 15th.—PETER W. G. GUNN, Esq., President of the Edinburgh Natural History Society, on "The Grampian Hills from End to End." Illustrated.

February 12th.—Rev. HOPE MONCRIEFF, M.A., on "Formosa, Past, Present and Future." Coloured Films.

DUNDEE, *Training College Hall*, at 7.30 p.m.

1945

October 17th.—SETON GORDON, Esq., C.B.E., B.A.(Oxon.), M.Z.S., M.B.O.U., on "The Western Highlands and Islands and their Wild Life." Illustrated.

October 24th.—Major-General G. CHEETHAM, Director-General of the Ordnance Survey, on "Maps and Map Making with special reference to the new O.S. Series." Illustrated.

November 14th.—JOHN B. TAIT, D.Sc., Ph.D., F.R.S.E., on "Exploration of the Sea." Illustrated.

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ANNUAL GENERAL MEETING

The Annual General Meeting was held in the Society's Rooms in Edinburgh, October 10th, 1945, Prof. Sir D'Arcy Thompson presiding.

The Annual Report of the Council was submitted and, on the motion of Sir Thomas Whitson, seconded by Arthur W. Russell, unanimously accepted.

The Financial Statement was submitted by Mr. D. G. Moir, Hon. Secretary, and its adoption was moved by Mr. Rendel R. Clarke and seconded by Dr. Douglas Guthrie.

The list of nominations of Office-Bearers recommended by the Council was read by the Hon. Secretary as follows:—"That Sir D'Arcy Thompson, C.B., D.C.L., F.R.S., be re-elected President; that Robert Grant be re-elected Chairman of Council; that David Alan Stevenson be elected Hon Treasurer, and that Captain Angus Buchanan, M.C., Arthur W. Russell, W.S., and Sir Ernest M. Wedderburn, LL.D., be elected additional Vice-Presidents."

On the motion of Sir Thomas Whitson, seconded by Sir Hugh Macpherson, the nominations were approved.

"That the following Members of the Society be elected to fill the vacancies existing on the Council:—Douglas A. Allan, D.Sc.; John Anthony, M.C., M.A., B.Sc.; Robert Rendel Clarke, B.Sc.; Kirkland C. Craig, M.A.; Mrs. Annie Cormack; Richard T. Currall, M.A.; Edward Wyllie Fenton, M.A., D.Sc.; Arthur Geddes, D.-ès-L., Ph.D.; Alexander Good; William P. Haldane; Miss Margaret A. O. Russell; Harold Skelton; John Wishart, K.B.E., M.A."

It was intimated that there were still three vacancies on the Council, and it was proposed by Dr. C. P. Snodgrass, seconded by Mr. John Bartholomew, M.C., M.A., that James Y. Erskine, M.A., B.Com., Training College, be included in the list. On the motion of Miss Isobel W. Hutchison, seconded by Miss Maud Newbigin, the name of Mrs. John Mathieson was also included.

The recommendations were approved and the other honorary Office-Bearers who had not resigned were re-elected.

The Chairman thanked the retiring Members of Council who had completed their term of office:—Charles A. Malcolm, M.A., Ph.D.; the Right Hon. Sir J. R. Clark, G.C.M.G., C.B.; Captain Angus Buchanan, M.C.; Erik Schacke; Arthur W. Russell, W.S.; Robert Campbell, D.Sc.; Miss Amy J. Atkinson, L.L.A.; Robert P. Mathewson, J.P.; and A. Ninian Bruce, M.D., D.Sc. Captain Angus Buchanan and Arthur W. Russell were appointed Vice-Presidents and Dr. C. A. Malcolm, Honorary Librarian.

The Chairman in his remarks referred to the great loss the Society had sustained by the death of Mr. John Mathieson. He also referred to the resignation of Mr. William O. Leitch, the Hon. Treasurer, for health reasons, and expressed appreciation of the great help he rendered the Society during the war years.

The Chairman congratulated the Society on its great increase of membership, and was glad to see that the Dundee and Aberdeen Branches were resuming their activities.

He referred to the arrangements recently made with the Scottish Anthropological Society. He felt sure that both institutions would derive mutual benefits from this close co-operation.

He welcomed the foundation of the Oceanography Group under the guidance of Dr. John Tait.

The introduction of Film Shows and the arrangement made for a special lecture on Map Reading by Colonel Thomas Penney of the Ordnance Survey would, he felt sure, be helpful in the Society's new activities for young people.

Mr. Alexander Harrison was thanked for taking over duties during the absence of the Hon. Treasurer.

On the motion of Dr. Douglas Guthrie, a vote of thanks was unanimously awarded to the Chairman.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

REPORT OF COUNCIL

SIXTY-FIRST SESSION, 1944-1945

1st July 1944 to 30th June 1945

ORDINARY MEMBERSHIP

The changes during the session were as follows :—

On the Roll at 1st July 1944		1511
New Members		281
		1792
Deduct by Death	20	
,, Resignation	88	
	—	108
On the Roll on 30th June 1945 (including 62 in arrear)		1684

The total Membership is analysed thus :—Edinburgh Ordinary 942 ; Edinburgh Corporate 3 ; Glasgow Ordinary 331 ; Glasgow Corporate 17 ; Dundee 46 ; Aberdeen 32 ; Life Members 137; Honorary Members 5 ; Members on Active Service 8 ; Associates 34 ; Outside Area Members 129.

MEDAL AWARDS

The following Awards were made :—

THE SOCIETY'S GOLD MEDAL	James M. Wordie, B.Sc., F.R.S.E.
THE LIVINGSTONE GOLD MEDAL	Noel Ewart Odell, Ph.D., F.R.S.E., F.G.S.
THE SOCIETY'S RESEARCH MEDAL	Professor Alan G. Ogilvie, O.B.E., M.A., B.Sc., F.R.S.E.
MUNGO PARK MEDAL	Frank Fraser Darling, D.Sc., Ph.D., F.R.S.E.
NEWBIGIN PRIZE	Catherine P. Snodgrass, M.A., Ph.D.

For fuller particulars of these Awards see *S.G.M.*, Vol. 61, p. 32.

BRUCE MEMORIAL PRIZE (Committee representing the Royal Society of Edinburgh, Royal Physical Society of Edinburgh, and the Royal Scottish Geographical Society).—Lt. H. T. Manning, R.C.N.V.R. for his valuable survey and Geological work from 1931 to 1939 in Iceland, Lapland, Southampton Island, Hudson Bay, and at Foxe Basin.

SCOTTISH UNIVERSITIES MEDAL

Aberdeen University.—Isabella Mary Cameron, First Place Ordinary Class, 1944-45.

Edinburgh University.—Joyce U. Douglas, First in the Class of Geography (Second Course), 1944-45.

DIPLOMA OF FELLOWSHIP

During the session the Diploma of Fellowship was awarded to :—

Honorary Diploma.—Professor Alan G. Ogilvie, O.B.E., M.A., B.Sc., Edinburgh University (see *S.G.M.*, Vol. 61, p. 32). Professor R. N. Rudmose Brown, Sheffield University, for his valuable contributions to Polar Exploration, to Geography, and for his great services to the Society. Alexander Harrison, C.A., in recognition of his strenuous endeavour as a mountaineer in various parts of the world and for valuable services rendered to the Society.

Ordinary Diploma.—Dr. William Moseley Brown, New York, late Professor in the University of Guadalyara, Mexico, for his work in connection with South American Exploration. Squadron Leader the Rev. D. McNeill Livingstone in recognition of his travels in Australia, Persia, Iraq, and Sinai, and for his lectures and writings on these travels.

Meetings of the Society

The Society held 27 Meetings during the session, 6 evening lectures in the Usher Hall, 13 Wednesday afternoon lectures in the Lothian Road Church Hall, 6 in the Lyric Theatre, Glasgow, and 2 special lectures in the Royal Philosophical Society's Rooms, Glasgow, for the School Junior Corporate Members. List and date of Lectures, see p. 64, Vol. 60, and p. 32, Vol. 61.

Owing to illness, Mrs. M. H. Austin was unable to lecture on 7th March, and a lecture was given on this date by Mr. Roland E. Cooper, F.R.S.E., F.R.S.G.S., on " Cultural Relations of Some Himalayan Plants."

The meetings for the School Junior Corporate Members were addressed by Ernest A. Manchester, whose subject was " Map Making," and Bailie John S. Clarke on the " Story of the River Clyde."

The lectures were generally well attended.

Library and Map Department

The number of books presented for review is the lowest recorded for several years. The presentations of books were very good.

During the session 4,310 volumes and 110 map sheets were issued to Members of the Society. The following additions have been made :—275 volumes, 62 pamphlets, 112 map sheets, and 9 atlases. Of the books added, 102 were presented.

The Council desire to record their thanks to the Hydrographer of the Navy, the U.S. Office for War Information, the Central and South-East Scotland Regional Planning Advisory Committee, and the Permanent Committee on Geographical Names.

The Council also thanks the undermentioned private donors of books, maps, and other presentations :—Mr. John Bartholomew, Miss Ella Christie, Mrs. A. Cormack, Miss Grant Donaldson, Mr. Robert Grant, Mr. Ian Gilmour, Commander C. R. V. Gibbs, Mrs. A. H. Gilruth, Mr. A. McWatt Green, Dr. Clayton Grosvenor, Miss Ida M. Hayward, Mr. G. Erskine Jackson, Mr. John Mathieson, Miss Maud Newbigin, Rev. George Stewart, Miss Jane R. Wylie.

Exhibition

To mark the 60th Anniversary of the Society's foundation an Exhibition was held in the Society's Rooms featuring the Scottish Countryside after the War. The Exhibition dealt with various aspects of country planning, National Parks, Forestry, Agriculture, Housing, Rural Industry, Recreation, the Forth Road Bridge and other matters, and depicted what was being done or suggested for the development of Scotland. Over 3000 visitors saw the Exhibition, which was on view from the 16th October until the 30th December.

The Society's Representatives

The following members were appointed to represent the Society :—

Association for the Preservation of Rural Scotland—Sir Hugh Macpherson ; Lt.-Col. John Johnston.

Scottish Council for National Parks—Lt.-Col. Gordon Dalyell of the Binns.

Bruce Memorial Prize Committee—J. M. Wordie ; Harold K. Salvesen.

Carnegie United Kingdom Trust : General Council—Robert R. Walls.

Joint Committee for Anthropological Research and Training—Robert Kerr.

National Committee for Geography—John Bartholomew.

National Trust for Scotland—Professor Alan G. Ogilvie.

Permanent Committee on Geographical Names—John Bartholomew.

Scottish National Memorial to David Livingstone—John W. Gourlay.

Obituary

It is with deep regret that the Council record the loss to the Society of 20 Members by death, among them the Rt. Hon. Lord Polwarth, a past President (see *S.G.M.*, Vol. 60, p. 92), Mr. William G. C. Hanna, a Member of Council, Mr. Adam P. Gray, a past Member of Council (see *S.G.M.*, Vol. 60, p. 93), Lt.-Col. P. E. C. Honeyman, and Dr. J. C. Buist a past Chairman of the Dundee Branch. Since completion of this report the Society has also sustained the loss of Mr. John Mathieson, F.R.S.E., F.R.S.G.S., Honorary Librarian ; Mr. George Graham Brown, F.R.S.G.S., a Vice-President, and Mr. George Erskine Jackson, O.B.E., M.C., W.S., Member of Council.